No. 2014-1636, -1637

United States Court of Appeals
for the
Federal Circuit

PROGRESSIVE CASUALTY INSURANCE CO.,

Appellant,

v.

LIBERTY MUTUAL INSURANCE CO.,

Cross-Appellant.

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. CBM2012-00003.

CORRECTED APPELLANT PROGRESSIVE CASUALTY INSURANCE CO.'S OPENING BRIEF

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November 14, 2014

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

Nos. 2014-1636, -1637

PROGRESSIVE CASUALTY INSURANCE V. LIBERTY MUTUAL INSURANCE CO.

CERTIFICATE OF INTEREST

Counsel for Appellant certifies the following:

1. The full name of every party or amicus represented by me is:

   Progressive Casualty Insurance Co.

2. The name of the real party in interest (if the party named in the caption is not the real party in interest) represented by me is:

   Not applicable.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or amicus curiae represented by me are:

   The Progressive Corporation
   Drive Insurance Holdings, Inc.

4. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by this firm in the trial court or agency or are expected to appear in this court are:

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Parties

Progressive	Progressive Casualty Insurance Company (Appellant)
Liberty	Liberty Mutual Insurance Company (Appellee)

Patents, Patent Applications, and Publications

the ’134 patent	U.S. Patent No. 5,797,134 (filed Jan. 29, 1996, issued Aug. 18, 1998) (A2973-986)
the ’358 patent	U.S. Patent No. 8,140,358 (filed Jun. 3, 2008, issued Mar. 20, 2012) (A87-150)
the ’598 patent	U.S. Patent No. 8,090,598 (filed Jan. 23, 2004, issued Jan. 3, 2012) (A2897-938)
the ’970 patent	U.S. Patent No. 6,064,970 (filed Aug. 17, 1998, issued May 16, 2000) (A2939-56)
the ’076 application	U.S. Patent Application No. 10/764,076 (A182-258), now U.S. Patent No. 8,090,598 (the ’598 patent)
the ’487 application	U.S. Patent Application No. 12/132,487, now U.S. Patent No. 8,140,358 (the ’358 patent)
the ’650 application	U.S. Patent Application No. 09/571,650, now U.S. Patent No. 6,868,386 (filed May 15, 2000, issued Mar. 15, 2005) (A151-81)
the ’929 application	U.S. Patent Application No. 13/617,929 (filed Sept. 14, 2012, issue notification mailed Oct. 29, 2014)
the ’958 application	U.S. Patent Application No. 08/592,958, now U.S. Patent No. 5,797,134 (filed Jan. 29, 1996, issued Aug. 18, 1998)
Herrod	UK Patent Application GB 2 286 369 (published Aug. 16, 1995) (A2486-91)

Nakagawa	U.S. Patent Publication No. 2002/0128882 (published September 12, 2002) (A259-79)

Defined Terms

AIA	Leahy-Smith America Invents Act
APA	The Administrative Procedure Act
BRI	Broadest Reasonable Interpretation
CBM	Covered Business Method
CBMPR	Covered Business Method Patent Review
CCPA	Court of Customs and Patent Appeals
IPR	Inter Partes Review
NPE	Non-practicing entity
POSITA	Person of ordinary skill in the art
PTAB or Board	Patent Trial and Appeal Board
PTAB Practice Guide	Office Patent Trial Practice Guide
USPTO	United States Patent and Trademark Office

STATEMENT OF RELATED CASES

Pursuant to Fed. Cir. R. 47.5, Progressive Casualty Insurance Co. ("Progressive") identifies the following cases that will directly affect or be directly affected by this Court's decision in the present appeal:

1. *Liberty Mut. Ins. Co. v. Progressive Cas. Ins. Co.*, No. 2014-1639 (Fed. Cir.). This appeal from the Patent Trial and Appeal Board's ("Board") decision in CBM2013-00009 involves the same patent as the present appeal – U.S. Patent No. 8,140,358 ("'358 patent"). Appeal No. 2014-1639 has been designated as a companion case to the present cross-appeals.

2. *Progressive Cas. Ins. Co. v. State Farm Mut. Auto Ins. Co.*, No. 1:12-cv-1068 (N.D. Ohio).

3. *Progressive Cas. Ins. Co. v. Safeco Ins. Co. et al.*, No. 1:10-cv-1370 (N.D. Ohio).

4. *Progressive Cas. Ins. Co. v. Hartford Fire Inc. Co. et al.*, No. 1:12-cv-1070 (N.D. Ohio).

The following are identified as appeals from the Board's decisions in covered business method patent reviews ("CBMPRs") of patents that are related to, but distinct from, the '358 patent that is the subject of the present appeal. All are currently pending before this Court.

1. *Progressive Cas. Ins. Co. v. Liberty Mut. Ins. Co.*, No. 14-1466 (Fed. Cir.) (appeal from CBM 2012-00002 involving U.S. Patent No. 6,064,970 ("'970 patent")).

2. *Progressive Cas. Ins. Co. v. Liberty Mut. Ins. Co.*, No. 14-1586 (Fed. Cir.) (appeal from CBM 2013-00004 involving U.S. Patent No. 8,090,598 ("'598 patent")).

3. *Progressive Cas. Ins. Co. v. Liberty Mut. Ins. Co.*, No. 14-1656 (Fed. Cir.) (appeal from CBM 2012-00004 involving the '970 patent).

JURISDICTIONAL STATEMENT

The Board purported to exercise jurisdiction over Liberty Mutual Insurance Company's ("Liberty") petition under 35 U.S.C. § 6 and Section 18 of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 18(a)(1), 125 Stat. 284 (Sept. 16, 2011) ("AIA"). The Board issued a final written decision on February 11, 2014, and Liberty requested rehearing. A1; A4360. The Board denied Liberty's request for rehearing on April 1, 2014, and Liberty appealed on June 3, 2014. A4388-89; A4394-95; 37 C.F.R. § 90.3; 35 U.S.C. § 142; *see also* Fed. R. App. P. 4(a)(1)(b). Progressive timely filed its notice of cross-appeal on June 17, 2014.[1] A4400-01; Fed. R. App. P. 4(a)(3). This Court has jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. § 329.

[1] On August 8, 2014, the Court granted Liberty's motion to re-designate Progressive as the appellant in this appeal. Dkt. 21. Progressive filed a motion to reconsider the Court's order on August 19, 2014, explaining that priority – the primary issue raised by Liberty's appeal – was a threshold issue and that Progressive was not the aggrieved party in this appeal. *See* Dkt. 22. The Court denied Progressive's motion to reconsider on September 4, 2014. Dkt. 27.

STATEMENT OF THE ISSUES

1. Whether the Board erred in holding that claim 9 of the '358 patent is not entitled to priority based on the May 15, 2000 filing date of its grandparent, U.S. Application No. 09/571,650 ("'650 application") due to the '650 application's purported lack of written description support for components "in communication within a portable device" where the '650 application depicts and describes a small device plugged into a connector known in the art to be used with removable diagnostics devices, the Board relied on a legally incorrect construction of "in communication within," and the Board properly found priority for claim 1, from which claim 9 depends.

2. Whether the Board legally erred in holding that dependent claims 2-18 of the '358 patent would have been obvious based on U.S. Patent Publication No. 2002/0128882 ("Nakagawa") in combination with other prior art, and reached that holding by:

A. legally erring in imposing the burden of proof with respect to Nakagawa's disclosures on Progressive, the patent owner, rather than on Liberty, the challenger;

B. erroneously finding that claim 9 was not entitled to an earlier priority date (*see* Issue 1);

C. legally erring in construing the "selected vehicle data" and "database" limitations, and then applying those claim constructions to find, in error, that Nakagawa discloses every limitation of independent claim 1; and

D. erroneously finding that Nakagawa discloses a "rating factor" generated at the server as required by claim 1.

STATEMENT OF THE CASE SETTING OUT THE FACTS RELEVANT TO THE ISSUES

I. PROGRESSIVE'S USAGE-BASED INSURANCE INVENTION

A. Progressive Pioneers Usage-Based Insurance

Progressive owns a family of patents directed to its invention of usage-based insurance, which Progressive pioneered with its "Snapshot" program. A3123-24; A3172. Progressive's custom built Snapshot® device is depicted below:

A3177. The Snapshot® device plugs into a car's onboard diagnostic port, where it records information such as time of day, vehicle speed, miles driven, and sudden stops, transmitted across a vehicle's internal data communication system, i.e., a vehicle bus. *See* A130-33, 3:59-4:39; 6:22-10:4. The data is sent via wireless communication to Progressive, which uses it to adjust insurance premiums.[2] A Snapshot® user can access the recorded information and view premium information

[2] Amy Danise, *Control your own car insurance costs: Pay as you drive*, Insure.com (May 29, 2009).

via an online services interface. *E.g.*, A97, Fig. 5; *supra* Danise, at 4; A134-35, 12:29-13:24, 14:19-35.

With Snapshot, Progressive overcame market skepticism and individual privacy concerns to become "one of the early leaders" in the field of usage-based insurance. A3177. In 1994, the usage of a global positioning system for the insurance industry – a necessary predicate for collection of some usage information – was considered akin to "black magic" and "science fiction." A2728-29. Usage-based insurance also faced the negative perception that it constituted "an invasion of privacy." *Supra* Danise, at 4; A139, 21:5-7. Notwithstanding these obstacles, by January 2012, Progressive was enrolling 50,000 new usage-based insurance policyholders a month in 39 states. A3172.

Other insurers, such as Liberty, have been keenly aware of Progressive's accomplishments with usage-based insurance and have sought to replicate Progressive's success. *Supra* Danise, at 4. One commentator noted, "While Progressive was first out of the gate in implementation of usage-based car insurance, there's a pack forming at the starting line." *Id*.

B. The '358 Patent

1. The Patent's Disclosure

The '358 patent contains 20 claims directed to a system for monitoring and storing vehicle data and wirelessly transmitting the stored vehicle data to a remote

1. A system that monitors and facilitates a review of data collected from a vehicle that is used to determine a level of safety or cost of insurance comprising:

a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle;

a memory that stores selected vehicle data related to a level of safety or an insurable risk in operating a vehicle;

a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network and a server;

a database operatively linked to the server to store the selected vehicle data transmitted by the wireless transmitter, the database comprising a storage system remote from the wireless transmitter and the memory comprising records with operations for searching the records and other functions;

where the server is configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects a premium of an insurance policy, safety or level of risk; and

where the server is further configured to generate a rating factor based on the selected vehicle data stored in the database.

9. The risk management system of claim **1** where the processor, the memory, and the wireless transmitter are in communication within a portable device.

19. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** where the server is further configured to calculate an insured's premium under the insured's insurance policy based on the rating factor, or a surcharge or a discount to the insured's premium, based on the rating factor.

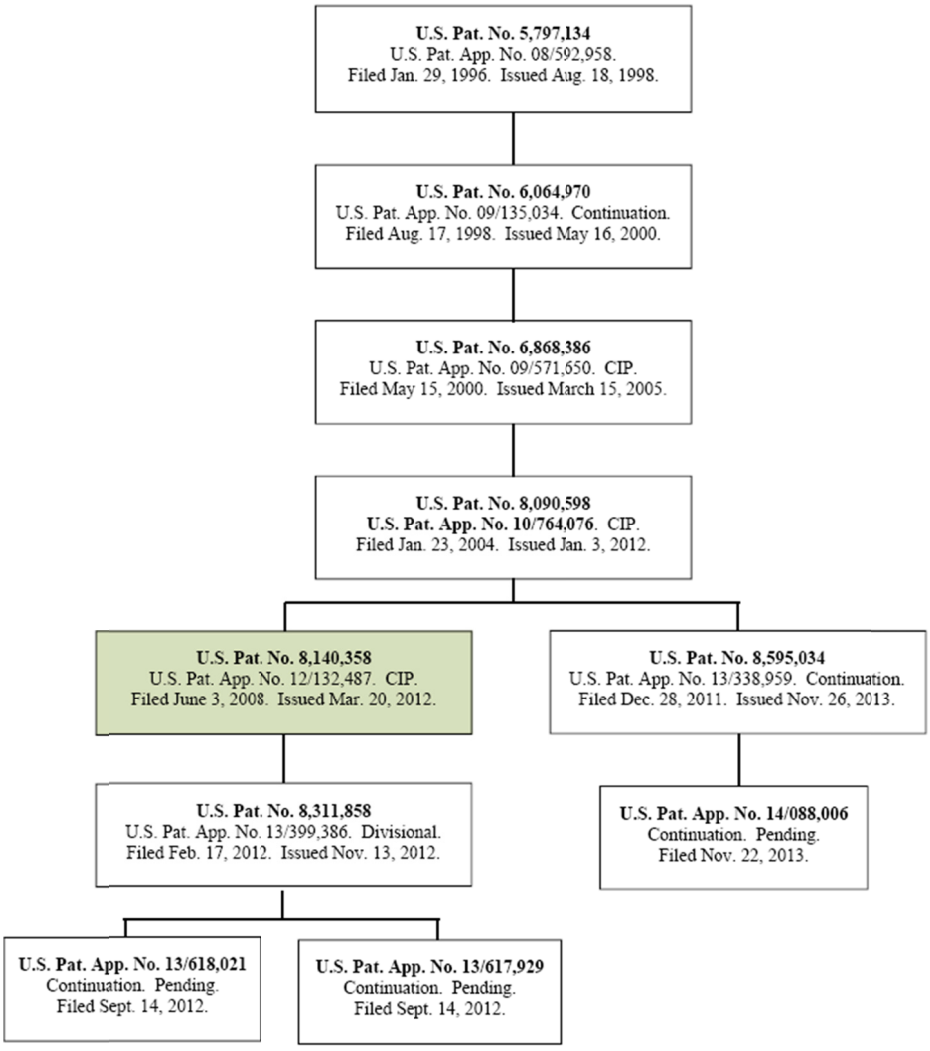
20. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** where the server is further configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects an insured's premium under an insured's insurance policy.

server, where it is stored as records in a database and processed. A149-50, 41:56-44:19. Claim 1, reproduced on the facing page, is the sole independent claim. A149, 41:56-42:12. Dependent claims 2-20 include additional limitations directed to, *inter alia*, specific features of the claimed wireless transmitter, the claimed wireless network, an additional dynamic memory allocation processor, an additional receiver, and specific configurations of the claimed components. A149-50, 42:13-44:19. Dependent claims 9, 19, and 20 are particularly relevant to this appeal and are reproduced on the facing page. A149-50, 42:60-62, 44:8-19.

2. Prosecution History

The ’358 patent issued on March 20, 2012, from U.S. Patent Application No. 12/132,487 (“’487 application”). A87. On its face, the ’487 application lists its ultimate parent as U.S. Patent Application No. 08/592,958, filed on January 29, 1996. *Id*. Progressive subsequently filed several continuation and continuation-in-part patent applications, which culminated in the issuance of patents related to Progressive’s usage-based insurance invention, including the ’358 patent (highlighted in green in the patent family tree below).

Figure 1: Progressive's Usage-Based Insurance Patent Family



A87.

On September 5, 2014, the United States Patent and Trademark Office ("USPTO") allowed a grandchild application of the '358 patent, U.S. Patent Application No. 13/617,929 ("'929 application").[3] Notably, all of the references

[3] '929 application, USPTO Patent Application Information Retrieval, http://portal.uspto.gov/pair/PublicPair (search for "13/617,929" under "Search for

cited to the Board in this case were also before the Examiner during prosecution of the '929 application. *Id.*; A87-A92.

As shown above, U.S. Patent Application No. 09/572,650 ("'650 application") (A151-81) was filed on May 15, 2000, and is the first of three continuation-in-part applications in the '358 patent's lineage. As filed, the '650 application contained Figures 1-6. Figures 1-6 of the '650 application are substantively identical to Figures 1-6 of the '358 patent. *Compare* A176-A81 ('650 application) *with* A93-A98 ('358 patent).

On January 23, 2004, Progressive filed a second continuation-in-part application, U.S. Patent Application No. 10/764,076 ("'076 application") (A182-258). The Detailed Description of the Preferred Embodiments in the '076 application contains the same disclosures as that section of the '650 application, with some small modifications. *Compare* A190-202 ('076 application) *with* A159-71 ('650 application). However, the '076 application also contains a modified summary of the invention section, new Figures 7-18, and supplemental disclosures beginning on page 21 of the application. A187-88; A202-41; A247-58. The supplemental disclosures principally provide additional detail regarding a means to display and manipulate insurance data. A212-22; A247-58.

Application" by "Application Number"). The '929 application will be issued as U.S. Patent No. 8,892,451 on November 18, 2014.

In the ’487 continuation-in-part application, Progressive supplemented the original text of the ’650 and ’076 applications with additional details expanding on the original disclosures. For example, the ’487 continuation-in-part application provides additional detail about the communication link made through a cellular, radio, satellite, or other communication system, describing the link as transceiver protocols that provide broadband wireless access to mobile devices. *Compare* A131, 5:28-6:22 *with* A161; 20-22; A192:18-20. Progressive also added Figures 19-35, which illustrate communication channels, power management processes, software updating processes, and graphical displays. A111-28.

During prosecution of the ’487 application, the USPTO considered nearly 300 U.S. and foreign patents and published patent applications and dozens of non-patent publications. A87-A92.

II. LIBERTY’S FILING OF CBMPR PETITIONS CHALLENGING THE ’358 PATENT

A. Liberty’s CBMPR Strategy

On the very first day of the CBMPR program, September 16, 2012, Liberty filed the first of ten CBMPR petitions attacking Progressive’s patents covering its usage-based insurance and online servicing inventions.[4] These CBMPR petitions

[4] In addition to the CBMPRs underlying the appeals listed in the Statement of Related Cases, *supra*, at x, Liberty also filed CBM2012-00011, CBM2013-00001, and CBM2013-00003. The Board denied review based on these petitions.

followed Liberty's prior ex parte reexamination attacks against three Progressive patents, including one in the '358 patent family.[5]

Liberty's serial attacks on Progressive's portfolio ultimately included six Covered Business Method ("CBM") petitions directed to the '358 patent family alone. *See* '358 patent (CBM2012-00003, CBM2013-00009); '970 patent (CBM2012-00002, -00004); '598 patent (CBM2013-00003, -00004). Liberty's strategy paid off before the Board: not one reviewed claim of any Progressive patent challenged by Liberty has ultimately survived. Progressive is not alone: One commentator has reported that, of the 357 claims evaluated under the CBMPR and inter partes review ("IPR") programs between its inception and March 2014, only 13 claims survived.[6]

B. Liberty's Petitions Challenging The '358 Patent

The CBMPR that resulted in this appeal stems from the third petition ever filed. In that petition, Liberty asserted 422 grounds for invalidity. A3051-52. On

[5] Liberty's strategy is contrary to the Congressional intent behind CBMPR to target a class of patents commonly associated with non-practicing entities ("NPEs"). 157 Cong. Rec. S1362 (daily ed. Mar. 8, 2011) (statement of Sen. Leahy). "Section 18 is not intended to allow owners of valid patents to be harassed or subjected to the substantial cost and uncertainty of the untested review process." *See* 157 Cong. Rec. S5428 (daily ed. Sept. 8, 2011) (statement of Sen. Pryor).

[6] Morton & Prange, *Patent owners beware, your patent has a 15 percent chance (or less) of surviving the PTAB*, Inside Counsel (Mar. 19, 2014).

October 25, 2012, the Board denied 196 of the 422 grounds presented in Liberty's petition for CBM2012-00003 as not meeting the threshold for institution of a CBMPR. A3069-71; A71. On November 19, 2013, Liberty filed a new petition, again challenging the '358 patent as obvious based in large part on prior art that had formed the basis for the 196 grounds rejected by the Board in CBM2012-00003. *Compare* A3052-67 *with* A5247-49.[7] That petition forms the basis of CBM2013-00009, which is presently pending before this Court as companion appeal No. 2014-1639.

C. Nakagawa

Nakagawa[8] was published on September 12, 2002. A259. Accordingly, Nakagawa is not prior art to the '358 claims that are entitled to priority based on the May 15, 2000 filing date of the '650 application.

Nakagawa discloses a vehicle insurance system based on the maintenance of a vehicle. A270, ¶¶ 2, 5. Notably, the USPTO initially rejected nearly all of Nakagawa's application claims as anticipated by Progressive's U.S. Patent No. 5,797,134 ("'134 patent"), the grandparent of the '650 application. *See* U.S. Pat.

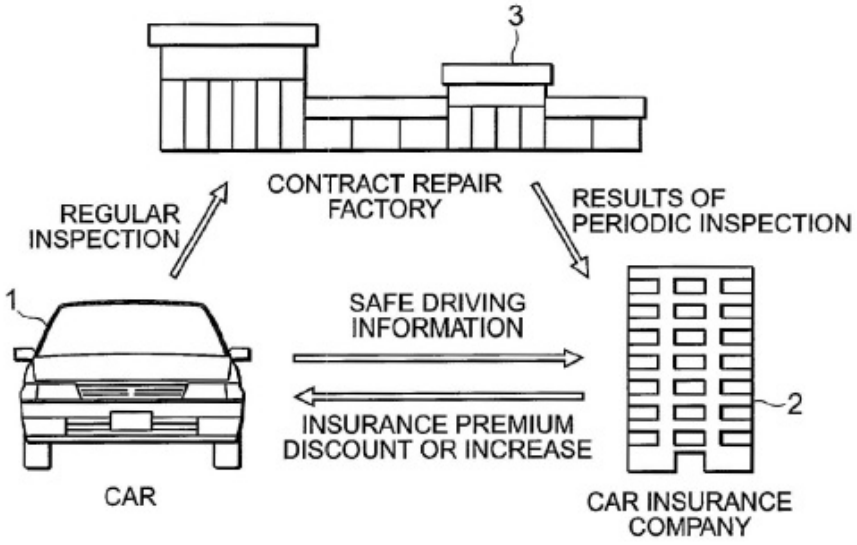
[7] Citations to Appendix pages 5000 or greater refer to companion appeal no. 14-1639.

[8] Nakagawa was also relied upon by the Board in the CBMPR underlying Appeal No. 2014-1586, which concerns U.S. Patent No. 8,090,598. *See supra* Statement of Related Cases, at x.

App. 10/083,566, Office Action of April 7, 2006, at 2. Nakagawa never issued. *See id.*, Notice of Abandonment of February 12, 2008.

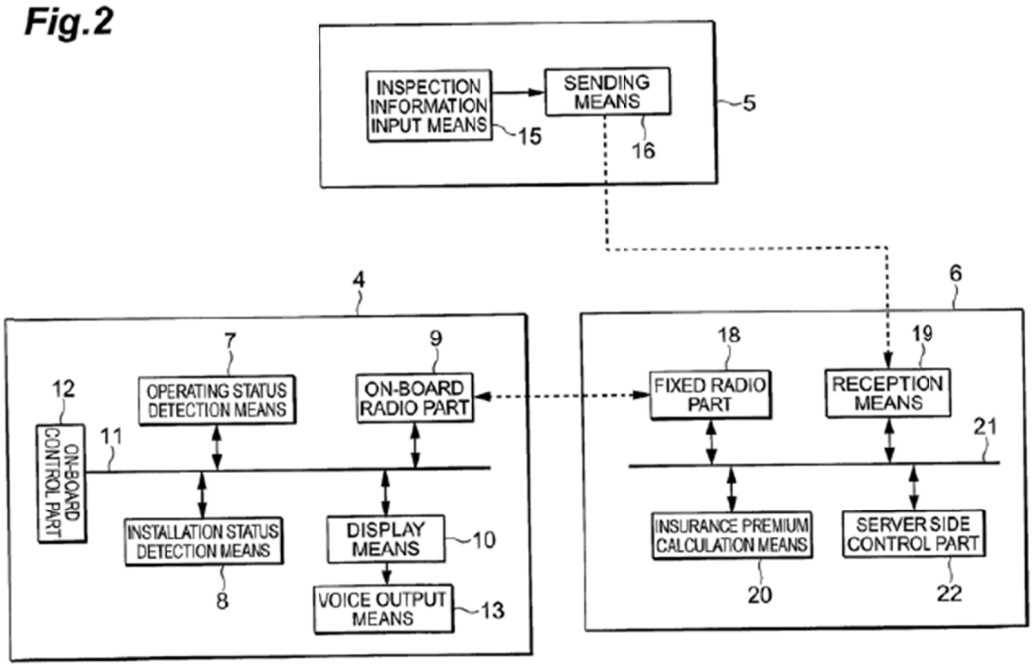
During the CBMPR proceedings, Liberty and the Board relied on Nakagawa's "first embodiment," initially described in Figure 1 at paragraph 47 and then in Figure 2 at paragraph 52. A272-73.

Nakagawa FIG. 1: General Concept



A260.

Nakagawa FIG. 2: Block Diagram of First Embodiment



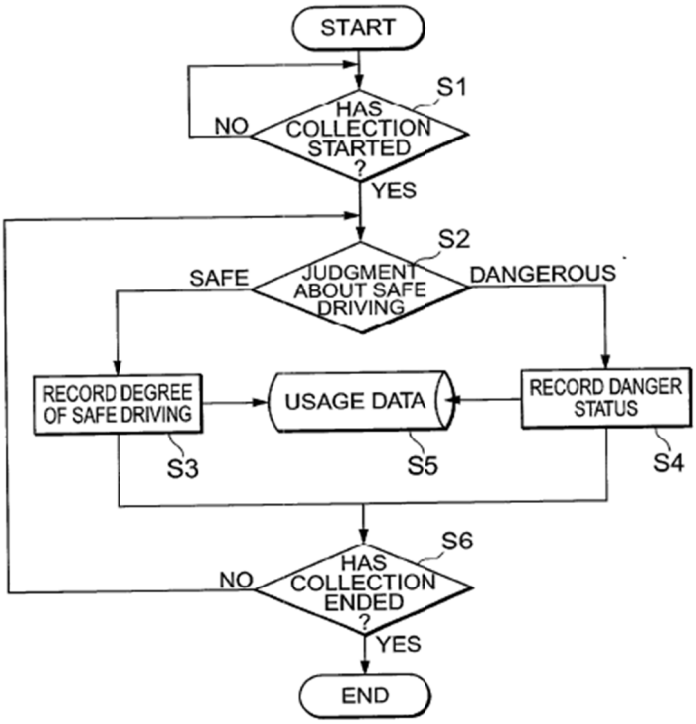
A261.

In Figure 2, a server apparatus (6) installed at an insurance company communicates with: (A) an onboard apparatus (4) in a car; and (B) a maintenance data management means (5) installed at a contract repair facility. A273, ¶¶ 52-55. The onboard apparatus (4) collects information relating to the operation of the car and the installation of safety equipment. *Id.*, ¶¶ 53. The onboard control part (12) controls the onboard apparatus (4). *Id.*, ¶ 58. The maintenance data management means (5) installed at the contract repair factory manages data that indicates whether or not the car has been properly maintained. *Id.*, ¶ 59. Information gained from an inspection that may reflect the condition of fluids, brake pads, and timing

belts, is sent to the server apparatus (6), which calculates insurance premiums based on that data. A273-74, ¶ 60-61.

The operation of the onboard apparatus (4) is shown in Figure 3:

Nakagawa FIG. 3: Onboard Apparatus



A262. At Steps 1 and 2, the onboard control part (12) collects data from operating status detection means (7) and installation status detection means (8) from which it "determines whether the operation and installation statuses are safe or dangerous." A274 at ¶¶ 64-65. These determinations are based on vehicle sensor data that are converted into points that are stored in onboard memory. *Id.*; A3360-61, ¶ 14. Once converted, however, these points do not indicate the sensor data from which they were generated. Rather, in Nakagawa's words:

> When it determines that both the operating and installation statuses are safe, the degree of safe operation is recorded in point form (step S3). When it determines that the statuses are dangerous, the danger status is recorded in point form (step S4). The data stored in steps S3 and S4 are stored in the memory provided in the onboard control part 12 as "usage data" (step S5).

A274, ¶ 65. Thus, the onboard control part (12) converts the data into points that reflect not only the operating state of the vehicle but also the installation status of safety equipment. A274-75, ¶¶ 64, 65, 76; A3363, ¶ 17. A "safe" or "danger" point status does not distinguish between the operating state of the car or the installation of safety equipment, nor does it identify the source of the data. A "danger status" equally reflects a failure to properly install safety equipment just as it reflects an improperly positioned head rest. *See, e.g.*, A266, Fig. 7; A273, ¶ 55; A275, ¶ 76.

The operating/equipment installation point-value that Nakagawa calls "usage data" is transmitted to the server apparatus (6) by the onboard radio part (9) where it is stored in memory with contract repair factory data and a user ID. A274, ¶ 69; A3361-62, ¶ 16. An insurance premium calculation part (20) calculates an insurance premium for the next policy term based on this data. A274, ¶ 70; A3362, ¶ 17.

III. BOARD DECISIONS

A. Institution Decision

On February 12, 2013, the Board instituted trial on claims 1-20 of the '358 patent based on the 2002 Nakagawa publication alone or in combination with one or more additional references. A3194; A3209-14. Of the 20 claims of the '358 patent, Progressive demonstrated that four of those claims – claims 1, 9, 19, and 20 – were entitled to the benefit of the May 15, 2000 filing date of the '650 application. A3143; A3154-59.

In instituting trial, the Board rejected Progressive's argument that Nakagawa was not applicable prior art against claims 1, 9, 19, and 20 based on the claims' entitlement to priority based on the filing date of the '650 application. A3209-10. The Board's principal reason for rejecting Progressive's priority claims was that Progressive's claim chart for the '650 application did not also address the written description support of the intervening parent application, the '076 application. A3211.

The Board also identified five purported deficiencies in the '650 application's written description support identified by Progressive in its preliminary response:

- First, with respect to claim 1, the Board found that Progressive's claim chart did "not establish that the wireless transmitter is 'to transfer the selected

vehicle data retained within the memory to a distributed network and a server.'" A3212.

- Second, the Board held that Progressive's claim chart did not adequately account for the limitation of claim 1 requiring that "the server is configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects a premium of an insurance policy, safety or level of risk." A3212-13; A149, 42:5-9.
- Third, for claim 9, the Board found that because "Progressive does not identify a description of element 300 [in Figure 3] either as a portable device or as including the wireless transmitter," Progressive had not demonstrated adequate written description support for the "portable device" limitation. A3213.
- Fourth, with respect to claim 19's requirement that the "server is further configured to calculate an insured's premium under the insured's policy based on a rating factor, or a surcharge or a discount to the insured's premium, based on a rating factor," the Board found that the "portions of the '650 application cited by Progressive refer only generally to generation of an insurance cost based on all of the data and do not support a two-step procedure where a rating factor is first generated and then a premium or

surcharge discount to the premium is calculated based on that rating factor." A150, 44:9-13; A3213.

- Fifth, the Board found the limitations of claim 20 relating to "process[ing] selected vehicle data" were not adequately disclosed by the "portion of the '650 application cited by Progressive," because those portions "refer only generally to access of stored selected vehicle data to determine a cost of insurance based on that data, and do not account for the required processing of that data 'with' data that reflects how the selected vehicle data affects an insured's premium under an insured's insurance policy." A3214.

Based on the foregoing, the Board initially found that Progressive had not met its burden of proving priority to the '650 application for claims 1, 9, 19, and 20 at the institution stage. A3209. Notably, as the patent owner, Progressive was not permitted to present expert testimony at the institution stage. *See* 37 C.F.R. § 42.207(c).

In its institution decision, the Board did not analyze the merits of Liberty's contentions regarding the purported anticipation and obviousness of claims 1-20 based on Nakagawa. A3209. Instead, the Board simply noted that "Progressive does not argue against the substantive merit of the alleg[ations]" (A3209), and summarily concluded that it was more likely than not that Liberty would prevail on

its assertion of unpatentability of claims 1-20 based on Nakagawa alone or in combination with other references. A3214.

Notwithstanding the foregoing, the Board declined to institute trial on the alternate basis of GB 2 286 369 ("Herrod")[9] in combination with one or more additional references, finding that Herrod did not "satisfy[ ] the claim limitation of generating a rating factor" because Herrod's "in-vehicle analysis" was "already performed before the results are transferred to the remote computer." A3216-17.

B. Final Written Decision

In its final decision, the Board reconsidered its initial decision on lack of written description for four of the five claim limitations. A43-60 (citing A3296-327); A62-63. For each limitation other than the "portable device" limitation of claim 9, the Board was persuaded by Progressive's identification of additional disclosures of both the '650 and '076 applications and by Progressive's supplemental explanation of the teachings of the patents, as found in Progressive's response brief (A3294-327) and in a declaration from Mr. Ivan Zatkovich (A3384-437). Mr. Zatkovich has over 30 years of experience in the computer science, computer networks and software engineering fields, as well as more than four

[9] Herrod is at issue in Appeal No. 2014-1656, which concerns Progressive's U.S. Patent No. 6,064,970 and is also pending before this Court. *See supra* Statement of Related Cases, at x.

years of experience in designing and implementing vehicle telematics systems. A3438; A3554, ¶ 4.

Based on the extensive evidence provided by Progressive, the Board concluded that claims 1, 19, and 20 were entitled to an effective filing date of May 15, 2000, the filing date of the '650 application. A18. As a result, the Board held that claims 1, 19, and 20 of the '358 patent were neither anticipated by nor obvious over Nakagawa because Nakagawa was not prior art. *Id*. The Board remained unconvinced, however, that the '650 application provided adequate support for the "portable device" of claim 9 of the '358 patent. A60-62.

Without the benefit of priority to the '650 application, the Board ordered cancellation of claims 2-18 of the '358 patent as obvious based on Nakagawa in combination with other prior art. A43; A69-70. The Board ordered cancellation of claims 2-18 because it found Progressive's arguments unpersuasive as to why Nakagawa did not disclose the following three elements required by claim 1 (and thus its dependents): (a) "'selected vehicle data,' retained within memory, is transferred to a distributed network and a server; (b) a database operatively linked to the server; and (c) the server being configured to generate a rating factor." A25. The Board acknowledged that it based its obviousness conclusion for dependent claims 2-18 on its finding that independent claim 1 would have been anticipated by Nakagawa but for its priority determination with respect to claim 1. A18; A69.

C. Liberty's Request For Rehearing And The Rehearing Decision

In response to Progressive's rehearing request in CBM2013-00009, Liberty filed requests for rehearing seeking conditional relief in both CBM2012-00003 and CBM2013-00009. A4356-57. Specifically, Liberty requested that the Court "concurrently" deny Liberty's rehearing requests in the two separate CBMPR cases in order to avoid either CBMPR having a preclusive effect on the other under 35 U.S.C. § 325(e). A4357-58.

On April 1, 2014, the Board denied both parties' rehearing requests in both CBM2012-00003 and 2013-00009. A4391. The Court found Liberty's petition moot in light of its denial of Progressive's rehearing request and denied the request. *Id*.

SUMMARY OF THE ARGUMENT

This appeal stems from the third CBMPR petition ever filed and the first in which any claims even nominally survived a "trial" before the Board. Nevertheless, basing its decision on legally erroneous claim constructions and unsupported fact findings, the Board erroneously held that the vast majority of the claims of Progressive's '358 patent would have been obvious to a POSITA in view of Nakagawa in combination with other references.

For dependent claim 9, the Board erred in finding the claim was not entitled to the benefit of its grandparent application, the '650 application, based on a purported lack of written description support in the '650 application for components "in communication within a portable device." In finding a lack of disclosure of a "portable" device, the Board disregarded that the text accompanying Figure 3 of the '650 application states that the device may be attached via particular connectors that were commonly used in the field for removably attaching portable diagnostic devices. With respect to "in communication within," the Board took a wholly unreasonable approach, contrary to its broadest reasonable interpretation ("BRI") standard (and its expansive reading of Progressive's claims for purposes of obviousness), and improperly restricted the claim to require that the components be "contained" by the device – as opposed to simply "in communication within," as the claim language states.

The Board also engaged in improper creative claim construction in order to graft Nakagawa's point-based system onto the '358 patent. Nakagawa's 2002 patent application was derived from the groundbreaking usage-based insurance invention first disclosed by Progressive in its '134 patent. Nakagawa simply added information from a contract repair facility and taught that instead of sending potential personal information in the form of "driver safety data" to the insurer, information could be processed on board the vehicle, stored, and transmitted as less revealing "points." Nakagawa's proposed solution was to determine a number of points reflective of degrees of safe operation and store these points in the onboard memory. These points, however, are abstract and do not indicate the sensor data from which they were generated or on which they are necessarily based. Even the BRI standard cannot support the Board's expansive interpretation of "selected vehicle data" to cover Nakagawa's abstract points.

With respect to the "database" limitation, the Board's application of BRI was not broad enough to make a case for Nakagawa disclosing the "database" and "records" required by this limitation. Instead, the Board interpreted "database" and "record" based on its contrived "bare minimum" requirements for these terms. "Bare minimum" does not equate with the broadest reasonable interpretation and is not the applicable legal standard for claim construction. The Board's finding of

obviousness of claims 2-18 based on Nakagawa is premised on these improper constructions and must be reversed.

Even with its overly broad and unreasonable claim constructions and unsupported fact findings on Nakagawa, the Board was forced to acknowledge the validity of three claims of the ’358 patent over Nakagawa – claims 1, 19, and 20. Progressive presented overwhelming evidence demonstrating that these three claims are entitled to priority based on the May 15, 2000 filing date of the ’358 patent’s grandparent application, the ’650 application. As a result, the Board acknowledged that Nakagawa, which was published in 2002, was not prior art to claims 1, 19, and 20. However, Progressive’s victory with respect to these three claims in this CBMPR was short-lived. Later, the Board issued a decision in a second CBMPR (No. 2013-00009) invalidating all twenty claims of the ’358 patent based on different references in violation of the estoppel provision of 35 U.S.C. § 325(e). *See Progressive Cas. Ins. Co. v. Liberty Mut. Ins. Co.*, Appeal No. 2014-1639 (Fed. Cir.), Bl.Br., Argument Section III.

ARGUMENT

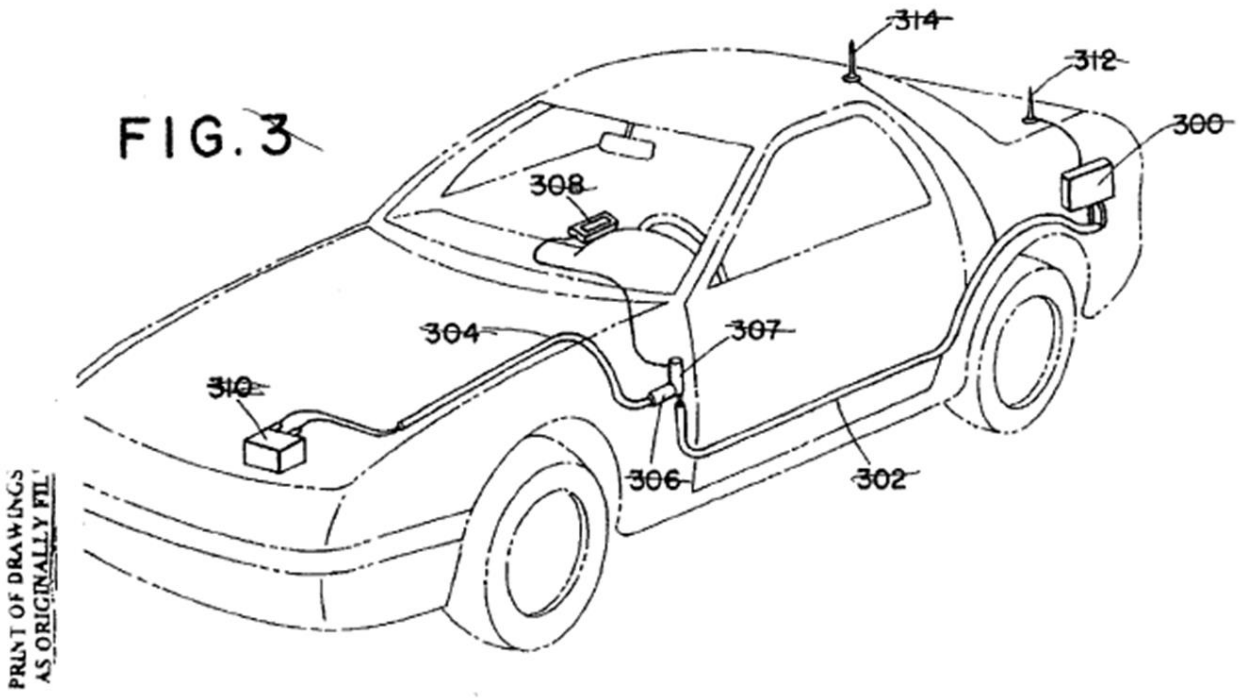
I. STANDARD OF REVIEW

The Board's legal conclusions are reviewed *de novo* while its factual findings are reviewed for substantial evidence. *In re Giannelli*, 739 F.3d 1375, 1378-79 (Fed. Cir. 2014) (citing *In re Gartside*, 203 F.3d 1305, 1315-16 (Fed. Cir. 2000)). Anticipation is a question of fact reviewed for substantial evidence. *Flo Healthcare Solutions, LLC v. Kappos*, 697 F.3d 1367, 1375-76 (Fed. Cir. 2012). Obviousness is a question of law based on underlying questions of fact. *Graham v. John Deere Co*., 383 U.S. 1, 17-18 (1966). Accordingly, this Court reviews *de novo* the Board's ultimate determination of obviousness under 35 U.S.C. § 103. *See Leo Pharm Prods., Ltd. v. Rea*, 726 F.3d 1346, 1353 (Fed. Cir. 2013).

Compliance with the written description requirement of 35 U.S.C. § 112, ¶ 1[10] is a question of fact, which is reviewed for substantial evidence on appeal from the Board. *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *In re Giannelli*, 739 F.3d at 1378-79.

[10] The pre-AIA version of 35 U.S.C. § 112 applies because the '358 patent was filed in 2008. AIA, § 4(c).

’650 Application: FIG. 3



II. CLAIM 9 IS ENTITLED TO PRIORITY BASED ON THE '650 APPLICATION

A. The Board Erred In Finding A Lack Of Written Description Support For Claim 9's "Portable" Device

The '650 application's depiction, and corresponding description, of a small computer that may be removably plugged into an onboard diagnostics port provides written description support for claim 9's "portable" device. *See* A149, 42:61-62; A60-61. As shown on the facing page's reproduction of Figure 3 of the '650 application, and as explained by Mr. Zatkovich, the computer's portability is evidenced by the size of element 300 in Figure 3, which is "comparable to the size of a gas tank cover," coupled with its "position[ ] near the left-rear wheel well." A3411, ¶ 109. Thus, rather than a unitary component of a large system centrally located in the engine, Figure 3 shows the computer as a small, stand-alone accessory, which may be placed in a location in the car conducive to removability, e.g., in the vicinity of the trunk. A178. Indeed, even the Board acknowledged that the "small size of a unit facilitates the unit's portability . . . ." A60; A178; *see* A3411-12, ¶¶ 109-10.

The text of the '650 specification confirms the optional portability of the onboard computer by explaining that information may be "communicated to the computer through a connections cable which is operatively connected to the vehicle data bus 304 ***through an SAE-J1978 connector, or OBD-II connector*** or

other vehicle sensors 306." A161:13-15 (emphasis added). It was known in the art that a cable could be plugged into these connectors, and that the cable could then be connected to a scan tool such as a hand-held meter or a computer console in order to perform automobile diagnostics. A3023-24. Thus, Mr. Zatkovich explained, "The onboard computer 300 being implementable in such a plug-and-play fashion evidences portability." A3411-12, ¶ 109.

The Board failed to recognize that the '650 application discloses multiple embodiments of an onboard computer, including a portable embodiment. *See* A60. The specification suggests three exemplary routes of connection between the computer and data bus: (1) through an SAE-J1978 connector; (2) through an OBD-II connector; or (3) through "other vehicle sensors 306." A161:13-15. Thus, the '650 specification suggests ***both*** a portable computer that may be connected to an onboard diagnostics port and a fixed computer that may be connected to "other vehicle sensors 306."[11] A161:13-15. Notably, Figure 3 depicts an embodiment with a connection through the "other vehicle sensors 306" – ***not*** through the SAE-J1978 or OBD-II connectors which were well known to be suited for removably

[11] In fact, Liberty's expert acknowledged that "relatively portable and inexpensive computing capability" was known in the 1990 time frame. A3518-19.

attaching an accessory, such as a diagnostic tool or, here, a portable computer for insurance purposes. *Id.*; A178.

The Board erred in dismissing the '650 application's disclosures even though they illustrate connectors that "facilitate[ ] the unit's portability" because they "do[ ] not require it." A60-61; *see Koito Mfg. Co. v. Turn-Key-Tech, LLC*, 381 F.3d 1142, 1154-55 (Fed. Cir. 2004). In *Koito*, one figure provided adequate written description support for "relative dimensions" of a claimed "flow channel," even though two other figures showing different embodiments that would not have supported the claimed dimensions. *Id.* at 1155.

Thus, contrary to the Board's finding, the written description requirement is met so long as an element is disclosed in the specification – the element need not be a "required" feature of every disclosed embodiment. *See id.*; A60-61. Accordingly, the '650 application's disclosure of using a connector cable to interface with the two connectors (SAE-J1978 and OBD-II), which a POSITA would have understood to be compatible with a portable plug-and-play device, complies with 35 U.S.C. § 112, ¶ 1, notwithstanding the specification's additional disclosure of a potential fixed connection.

B. The '650 Application Discloses Components "In Communication Within" A Device As Required By Claim 9

1. The Board Relied On An Improperly Narrow Construction Of "In Communication Within"

The Board legally erred in relying on an incorrect construction of claim 9's requirement that "the processor, the memory, and the wireless transmitter are ***in communication within*** a portable device" (hereinafter, the "in communication within" limitation) to find a lack of written description support in the '650 application. *See* A60 (emphasis added); *Rambus Inc. v. Rea*, 731 F.3d 1248, 1252 (Fed. Cir. 2013). The Board held that the '650 application's disclosure was inadequate to support the "in communication within" limitation because the wireless communication system (314) in Figure 3 of the '650 application "is ***external*** to onboard computer 300," such that there was no disclosure of a "portable device ***containing*** the processor, the memory, and the wireless transmitter." A61-62 (citing A161:20-22) (emphases added). Thus, the Board erroneously construed the "in communication within" limitation to require that the three components listed in the claim be "contain[ed]" within a single enclosure. *Id.*

The Board's construction of "in communication within" is contrary to the plain language of the claim. *See Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed. Cir. 1999) (overturning construction as contrary to the plain language of the claim). Claim 9 recites a processor, memory, and transmitter "in ***communication***

within a portable device." A149, 42:60-62 (emphasis added). Thus, the claim simply requires the exchange of data (i.e., communication) to occur within the portable device; it does not require that each of these three components be physically ***contained*** within a single enclosure. In fact, the claim does not recite any type of enclosure, does not require a housing, and does not specify any relative positioning of the various components. The Board erroneously injected these requirements into claim 9 when it determined that the '650 application fails to show a portable device "containing" the processor, memory, and transmitter. A61-62.

Nothing in the specification or prosecution history of the '358 patent supports the Board's interpretation of "in communication within" as meaning "contained by." *See id.* Instead, the specification explains that a component "may be integrated with ***or*** in communication with the device 300 or a vehicle." A136, 16:56-57 (emphasis added). Thus, the specification distinguishes between having integral components contained in a single enclosure, as opposed to separate components that are "in communication within" the device. *See id.* The specification also uses the word "contain" to describe embodiments where components are located within a single enclosure, some of which "include a self-contained assembly of components" (A138, 20:26-30), "single-chip cellular processors [that] contain all . . . processing functions within the single chip"

(A146, 35:51-53), and a "processor-containing system" (A148, 39:29). *See also* A143, 29:39; A144, 31:17, 53; A148, 39:37. By contrast, claim 9 was drafted to require components "in communication within," not "contained by" a single device.

2. The '650 Application Discloses Components That Are "In Communication Within" The Device

Absent the Board's importation of a single-enclosure limitation, the '650 application discloses the device of claim 9. *See* A96; A3412, ¶ 110. The '650 application explains that the computer (300) contains "a central processing unit and a memory device." A161:24-26. The block diagram of the in-vehicle computer system in Figure 4 of the '650 application indicates that the computer is an "on-board data logging and/or ***communication device***," which the specification explains is responsible for "communicating to a variety of external devices." A96 (emphasis added); A161:24-25. The specification also explains that all of the device's functions, including "communicating," "can be included in a single dedicated microprocessor circuit 300." A161:24-28. Accordingly, the ***communication*** between the components of claim 9 – the processor, memory and wireless transmitter – occurs "within" the portable device.

Like the grandparent of the '650 application, the '076 application contains Figure 4 as well as materially identical text describing how the device serves as a communication hub for the processor, memory and wireless transmitter. *Compare*

A161:23-27 *with* A192:21-26 (showing only changes between the grandparent and parent are two substitutions of the term "device" for "computer" and the addition of "such as"). Accordingly, the '076 application also contains adequate written description support for claim 9.

C. Substantial Evidence Demonstrates That Claim 9's Base Claim – Claim 1 – Is Adequately Supported, Entitling Claim 9 To Priority

Overwhelming evidence shows that the '650 application describes all of the features of claim 1 from which claim 9 depends, as the Board found and as is set forth below. *See* A43-A60. The Board's finding of adequate written description for claim 1 should have led the Board to find that claim 9 is entitled to priority based on the May 15, 2000 filing date of the '650 application because, as explained in the preceding sections, the added limitations of claim 9 also are adequately described in the '650 application.[12]

[12] Liberty relied on improper new declaration testimony in its reply brief – including a 13-page declaration from a new expert – to support its argument that the '650 application does not provide written description support for claims 1, 9, 19, and 20. *See* A3693; A3715; A3935-36. In the event that Liberty relies on these belated declarations with respect to priority in this appeal, Progressive reserves the right to challenge them.

Table 1: Written Description Support For Claim 9's Base Claim

Claim Limitation	Specification Support	
	'650	**'076**
1. A system that monitors and facilitates a review of data collected from a vehicle that is used to determine a level of safety or cost of insurance comprising:	"The present invention relates to data acquisition, processing and communicating systems, and particularly to a system for acquiring and handling relevant data for an insured unit of risk for purposes of providing a more accurate determination of cost of insurance for the unit of risk and for communicating or quoting the so determined cost to an owner of the unit of risk." A151:11-15. *See also* A156:28-31; A151:18-24; A177; A3144-45; A3385-86, ¶¶ 63-64.	A187:32-A188:4; *see also* A3415-16, ¶ 116
[1a] a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle;	"The computer 300 essentially communicates with a number of on-board vehicle devices for acquisition of information representative of various actual vehicle operating characteristics." A161:28-30. "An on-board computer 300 monitors and records various sensors and operator actions to acquire the desired data for determining a fair cost of insurance." A161:9-11. *See also* A161:23-A162:1; A179; A180; A3145-46; A3386-87, ¶¶ 65-67.	A192:21-31; *see also* A3416-18, ¶ 117
[1b] a memory that stores selected vehicle data related to a level of safety or an insurable risk in operating a vehicle;	"The computer 300 is comprised of several principal components, an on-board data storage device, an input/output subsystem for communicating to a variety of external devices, a central processing unit and memory device and a real time operating kernel for controlling the various processing steps of the computer 300." A161:24-27.	A197:12-17; *see also* A3418-19, ¶¶ 118-120

Claim Limitation	Specification Support	
	'650	**'076**
	"Selected ones of the plurality of raw data elements are recorded when they are determined to have an identified relationship to the safety standards." A157:2-4. *See also* [1a] above; A156:28-A157:7; A161:9-11; A161:23-A162:1; A179; A180; A3387-88, ¶¶ 68-70; A3146-48.	
[1c] a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network and a server;	"The vehicle is linked to an operation control center 416 by a communications link 418, preferably comprising a conventional cellular telephone interconnection, but also comprising satellite transmission, magnetic or optical media, radio frequency or other known communication technology." A162:9-12. "The communications link to a central control station [(i.e., the insurer)] is accomplished through the cellular telephone, radio, satellite or other wireless communication system 314." A161:20-22. "The unit of risk 200 is primarily concerned with transferring three classes of data between it and the insurer. The event data 500 and stored sensor data 502 have been discussed with reference to FIG. l." A169:8-10. In addition to "stored sensor data," the specification describes trigger events that "may result in a surcharge or discount during the insurance billing process" and "would be recorded in the in-vehicle recording device for future upload." A166:30-A169:1. *See also* A157:16-19; A160:26-A161:6; A161:9-11; A161:13-15, A162:5-12; A162:15-A164:26; A166:30-A167:2; A167:8-9; A168:5-16; A177-	A191:32-A192:1; A192:18-19; A193:10-15; A200:10-11; *see also* A3419-22, ¶¶ 121-123

Claim Limitation	Specification Support	
	'650	**'076**
	80; A3297-302; A3388-95, ¶¶ 71-82; A3148-49.	
[1d] a database operatively linked to the server to store the selected vehicle data transmitted by the wireless transmitter, the database comprising a storage system remote from the wireless transmitter and the memory comprising records with operations for searching the records and other functions;	"The insurer will acquire event data 508, sensor data 510, may update 512 the data process logic and then process 514 the raw data elements to generate either the calculated or derived data elements. All relevant data is stored 516 in a conventional data storage device 518." A169:21-24; A3149-50. "The data or events which are stored in stored device 518 are accessed by a billing algorithm 530 to generate a cost for the unit of risk in consideration of all the relevant data and events occurring in that period." A169:30-A170:1. Figure 2 depicts a system at 208 that contains one or more servers, including 222 ("Rating, Billing, Claims") and 220 ("Web Server") operatively linked to a database ("Data Storage"). A177, A3396-97, ¶ 84. Figure 5 shows a system of interconnected computer components downstream of the vehicle unit of risk 200, where the downstream system contains one or more servers, including 220 ("Web Server") and 530 ("Charges algorithm"/"Billing Algorithm") that access data in a database ("data storage" 518). A180; A169:30-A170:1; A3397-99, ¶¶ 85-88; A3400, ¶ 90. *See also* A3302-19; A169:23-24; A169:30-171:13; A3149-50; A3386, ¶ 65; A3395-402, ¶¶ 83-94; A54-60.	A200:23-28; A201:2-5; *see also* A3422-24, ¶¶ 124-127
[1e] where the server is	"[A]n apparatus and method for monitoring, recording and communicating insurance related	A187:12-16;

Claim Limitation	Specification Support	
	'650	**'076**
configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects a premium of an insurance policy, safety or level of risk; and	data for determination of an accurate cost of insurance based upon evidence relevant to the actual operation and in particular the relative safety of that operation." A160:17-20; A3405-06, ¶ 101; A3399, ¶ 88. "[S]ubject new insurance rating system retrospectively adjusts and prospectively sets premiums based on data derived from motor vehicle operational characteristics and driver behavior through the generation of new actuarial classes determined from such characteristics and behavior." A158:25-29; A3403-04, ¶¶ 96-98. "The data or events which are stored in the stored device 518 are accessed by a billing algorithm 530 to generate a cost for the unit of risk in consideration of all the relevant data and events occurring in that period." A169:30-A170:1; A3398-99, ¶ 87; A3403-05, ¶¶ 97, 99-100. "Selected ones of the plurality of raw data elements are recorded when they are determined to have an identified relationship to the safety standards. The recorded elements are consolidated for processing against an insured profile and for identifying a surcharge or discount to be applied to a base cost of automobile insurance. The total cost of insurance obtained from combining the base cost and surcharges or discounts is produced as a final cost to the operator." A157:2-7. "The subject inventions will base insurance charges with regard to current material data representative of actual operating characteristics to provide a classification rating of an operator	A187:20-24; A187:32-A188:13; A191:6-9; A201:2-5; A206:18-24; A214:14-24; *see also* A3424-31, ¶¶ 128-136

Claim Limitation	Specification Support	
	'650	**'076**
	or the unit in an actuarial class which has a vastly reduced rating error over conventional insurance costs systems." A156:15-18; A3406-07, ¶ 102. *See also* A177; A180; A3302-19; A3150-51; A3341, ¶ 33; A3347-48, ¶ 43; A3395-99, ¶¶ 83-88; A3403-07, ¶¶ 95-102; A54-60.	
[1f] where the server is further configured to generate a rating factor based on the selected vehicle data stored in the database.	"The subject new insurance rating system retrospectively adjusts and prospectively sets premiums based on data derived from motor vehicle operational characteristics and driver behavior through the generation of new actuarial classes determined from such characteristics and behavior, which classes heretofore have been unknown in the insurance industry. The invention comprises an integrated system to extract via multiple sensors, screen, aggregate and apply for insurance rating purposes, data generated by the actual operation of the specific vehicle and the insured user/driver." A158:25-31. "The subject invention will base insurance charges with regard to current material data representative of actual operating characteristics to provide a classification rating of an operator or the unit in an actuarial class." A156:15-18; A3408, ¶ 105; A160:28-A161:6; A158:1-7, 12-15; A169:30-A170:1; A3409, ¶ 106. "The recorded elements are consolidated for processing against an insured profile and for identifying a surcharge or discount to be applied to a base cost of automobile insurance." A157:4-6; A3410-11, ¶ 107.	A187:12-16; A201:2-5; A206:18-24; A213:23-25; A214:14-24; A214:31-A215:1; *see also* A3431-34, ¶¶ 137-142.

Claim Limitation	Specification Support	
	'650	'076
	See also A3302-19; A3152; A3341, ¶ 33; A3343-44, ¶ 39; A3347-48, ¶ 43; A3395-99, ¶¶ 83-88; A3407-11, ¶¶ 103-07; A49-60.	

III. THE BOARD ERRED IN HOLDING CLAIMS 2-18 OF THE '358 PATENT OBVIOUS BASED ON NAKAGAWA'S POINT SYSTEM

A. The Board Legally Erred By Placing The Burden On Progressive To Demonstrate Validity

The Board's final decision erroneously placed the burden on Progressive to demonstrate the '358 patent claims were not invalidated by Nakagawa alone or in combination with one or more other references. *See* 35 U.S.C. § 326(e); AIA, § 18(a)(1). Instead of evaluating whether Liberty met its burden to show by a preponderance of the evidence that Nakagawa and these references disclose each and every element of the claims (*see* 35 U.S.C. § 326(e); *In re Rambus*, 753 F.3d 1253, 1256 (Fed. Cir. 2014)), the Board simply adopted Liberty's arguments and then faulted Progressive for not presenting sufficient evidence to the contrary.

The improper burden-shifting framework employed by the Board is especially apparent with respect to claims 2-8 and 10-18. Notwithstanding the Board's statutory obligation to assess whether "it [wa]s more likely than not that" Liberty's evidence demonstrated that claims 2-8 and 10-18 were unpatentable, the Board simply stated that Liberty's arguments with respect to these claims "appear

to have merit." 35 U.S.C. § 324(a); 37 C.F.R. § 42.208(c); A3209. The institution decision provides no independent evaluation of whether the prior art cited by Liberty discloses all of the elements of these claims. *See* A3209-17. Likewise, the institution decision is silent as to a reason to combine the myriad of references cited by Liberty to arrive at the inventions of claims 2-8 and 10-18. *Id.* Instead, the Board simply presumed claims 2-8 and 10-18 were invalid because Progressive's initial response focused on priority for claims 1, 9, 19, and 20 and Nakagawa's deficient showings.[13] *See* A3209-17; A3119. Further, the Board's final decision contains no additional analysis as to its reasons for finding claims 2-8 and 10-18 obvious.

A serious flaw with the Board's approach is that it does not require a clear articulation of reasons why claims 2-8 would have been obvious and it requires the Patent Owner to file a response to challenges that only have an appearance of merit. The improper burden-shifting evidenced by the Board's treatment of claims 2-8 and 10-18 is contrary to the AIA and its implementing regulations, which indicate that a patent owner is not required to file a preliminary response to a petition for CBMPR. *See* 35 U.S.C. § 323; 37 C.F.R. § 42.207(a) ("The patent

[13] The Board's finding of obviousness of claims 2-18 based on Nakagawa in combination with other references is predicated on its finding that claim 1 would have been anticipated by Nakagawa but for its priority determination. A18; A69.

owner ***may*** file a preliminary response . . . .” (emphasis added)). The Board’s actions in this case indicate that unless a patent owner files a preliminary response and prevails at the institution stage – when the patent owner is not even permitted to present testimonial evidence – the patent owner risks carrying the burden to prove validity. *See* 37 C.F.R. § 42.207(a), (c).

The Board’s final decision also contains statements indicative of the Board’s improper burden-shifting for each of the three limitations the parties disputed with respect to claim 1 in view of Nakagawa alone. For example, the Board faulted Progressive’s proofs with respect to “selected vehicle data” as follows:

- “Progressive does not explain adequately why information about the usage status of the vehicle, as collected by what Nakagawa refers to in its Summary of the Invention as usage status detection means, implemented in Nakagawa’s preferred embodiments as operating status detection means and installation status detection means, are not vehicle ‘usage data.’” A29.
- “Progressive also does not explain adequately why the description in ¶ 0068 of Nakagawa that vehicle ‘usage data’ is read from memory and sent, when ‘thus read,’ by radio part 9 to the insurance company, refers only to the point scores described in ¶ 0065 of Nakagawa.” A29.
- “Progressive does not explain adequately why vehicle ‘usage data’ does not cover data collected by the operating status detection means and the

installation status detection means, which are stored in memory as described in ¶ 0058 of Nakagawa." A29.

- "Progressive has not offered a reasoned explanation as to why that is not the case." A30.

Similarly, the Board determined Progressive had not shown that Nakagawa lacked the "database" limitation based on its conclusion that "Mr. Zatkovich does not explain sufficiently his testimony," including "why a link need not be maintained between each User ID and the corresponding user data . . . ." A34.

The Board's analysis of "rating factor" is no different: the Board again faulted Progressive for not demonstrating validity:

- "Progressive has not shown that [sic] negates or replaces the processing described in Nakagawa's ¶ 0076 in connection with the calculation of an insurance premium, which occurs within server apparatus 6." A38.
- "In any event, Progressive has not shown that the point scores described in Nakagawa's ¶ 0065 are the same point scores described in Nakagawa's ¶ 0076, or that the process described in Nakagawa's ¶ 0076 refers to the onboard procedure described in Nakagawa's ¶ 0065." A39.

Thus, the Board approached each disputed claim limitation as being disclosed in the prior art unless proven otherwise by Progressive. However, the

burden of proving obviousness by a preponderance of the evidence should have been placed on Liberty – not on Progressive. *See Rambus*, 731 F.3d at 1255.

B. Nakagawa Does Not Disclose At Least Three Limitations Of Independent Claim 1 And Therefore Does Not Render Dependent Claims 2-18 Obvious

1. Nakagawa's Points Do Not Constitute "Selected Vehicle Data" As Claimed

The Board relied on an incorrect claim construction to reach an erroneous finding that Nakagawa's points comprise "selected vehicle data" as required by independent claim 1 and dependent claims 2-18 of the '358 patent.[14] *See In re Skvorecz*, 580 F.3d 1262, 1268 (Fed. Cir. 2009) (reversing anticipation finding that was predicated on an incorrect claim construction). Claim 1 recites a "memory that stores selected vehicle data related to a level of safety or an insurable risk of operating the vehicle" and a "wireless transmitter configured to transfer the selected vehicle data retained within the memory." A149, 41:61-65. The Board erred in finding that Nakagawa's disclosure of information recorded "in point

[14] The Board correctly held that independent claim 1 is not anticipated by Nakagawa because Nakagawa is not prior art to claim 1. A41-A60. Nakagawa's failure to disclose required limitations of claim 1 is nonetheless discussed because claims 2-18 depend on claim 1. A149-50; *see also* A18. Because Nakagawa does not disclose required limitations of independent claim 1, it also does not invalidate dependent claims 2-18. *See, e.g.*, *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) ("[D]ependent claims are nonobvious if the independent claims from which they depend are nonobvious . . . .").

form" onboard the vehicle before being sent to the server is "selected vehicle data," as claimed.

a. The Board Incorrectly Construed "Selected Vehicle Data" To Encompass Processed Data, Such As Points

The Board's error in finding Nakagawa discloses "selected vehicle data" stems from its flawed construction of the term. *See* A14-15. The Board interpreted "selected vehicle data" to mean "nothing substantively more than 'certain vehicle data,'" which it interpreted to "cover[ ] processed or calculated vehicle data." A14-15. Contrary to the Board's construction, the intrinsic evidence indicates that, in the context of the '358 patent, "selected vehicle data" does not cover "certain vehicle data" without restriction. Instead, in the context of the '358 patent, "selected vehicle data" is only that vehicle data that relates to a level of an insurable risk in operating a vehicle. A3274; A3372, ¶ 38.

A construction requiring that "selected vehicle data" relate to a level of an insurable risk in operating a vehicle is dictated by this Court's guidance that even where the BRI applies, claims must be construed consistent with the "express language of the claim and the specification." *See In re Suitco Surface, Inc.*, 603 F.3d 1255, 1260 (Fed. Cir. 2010). Claim 1 states that "selected vehicle data" is "related to a level of safety or an insurable risk in operating a vehicle." A149, 41:61-62. The claim further calls for the server, which is remote from the vehicle, "to generate a rating factor based on the selected vehicle data . . . ." A149, 42:10-

12. Thus, the claim language indicates that "selected vehicle data" is based on an insurable risk in operating a vehicle, and that such data has not yet been processed to generate a rating factor. *See Suitco*, 603 F.3d at 1260 (holding USPTO's construction of "finishing" material to fall "anywhere above the surface being finished" was unreasonably broad where the claim required a "material for *finishing* the *top* surface" (emphases in original)).

Consistent with Progressive's construction, the examples of "selected vehicle data" listed in the '358 patent specification are ***unprocessed*** data that relate to a level of an insurable risk in operating a vehicle. For example, the specification provides that "[o]ne or more selected data elements may be stored in a local memory" and lists "vehicle speed" as an exemplary data element. A133, 10:8-18. Similarly, the specification lists "exemplary events [that] may be recorded and stored in the in-vehicle portable recording device 300 for future upload" as including: (1) "Excessive speed"; (2) "Presence of alcohol or controlled substances"; (3) "Non-use of seatbelt"; (4) "Non-use of turn signals"; and (5) "ABS application without an accident." A134, 11:50-12:5. Likewise, columns 7 and 8 of the '358 patent list numerous types of raw data elements, calculated information (e.g., deceleration, acceleration), and derived data elements. A132, 7:15-8:32. Contrary to the Board's overly broad view of "selected vehicle data,"

none of the elements listed in the specification represents ***processed*** insurance risk, unlike the points in Nakagawa.

The Board misread the specification's recitation of "calculated" and "derived" data elements to erroneously conclude that "selected vehicle data" should be construed to "cover[ ] processed or calculated vehicle data." *See* A15 (citing A132, 7:11-13). The type of calculation and derivation described in the specification refers to calculating and deriving additional elements of vehicle operation data, and is distinct from processing to determine insurance risk. For example, the specification categorizes vehicle operation data that may involve simple arithmetic (e.g., "closing speed on vehicle in front," "distance traveled") as "Calculated Information." A132, 8:5-24. These examples are not data readily available from the vehicle or vehicle sensors. Instead, these data elements must first be calculated from the recorded vehicle data. Similarly, "Derived Data Elements" involve comparison between vehicle information and an external factor, e.g., speed limit, traffic signs, road conditions at the relevant location, which are also not readily available from the vehicle. A132, 8:25-32.

Not one of the "calculated" or "derived" elements listed in the '358 specification involves ***processing*** the data to assess safety or danger. Instead, the '358 specification's "Calculated" and "Derived" elements are directly reflective of vehicle operation. Once calculated and derived, these elements are then available

to be processed to determine insurance risk. Accordingly, the Board erred in relying on the '358 specification's discussion of "calculated" and "derived" data to broaden "selected vehicle data" to cover processed data representative of insurance risk in point form.

b. Nakagawa Does Not Disclose "Selected Vehicle Data" Under The Correct Construction

The Board erred in finding Nakagawa anticipates claim 1 because Nakagawa's "points" do not meet the "selected vehicle data" limitation. Specifically, Nakagawa does not disclose recording "selected vehicle data" onboard the vehicle and then wirelessly transferring that "selected vehicle data" to a central server for processing to generate a rating factor. *See* A29-30; A149, 41:61-42:13. Instead, paragraph 65 of Nakagawa explains that its onboard control part processes vehicle data to determine whether "both the operating and installation statuses are safe" and the "degree of safe operation is recorded in ***point form*** . . . ." A274, ¶ 65 (emphasis added). Nakagawa refers to the final processed points generated at the vehicle as "usage data," which are then sent to a server for insurance premium calculation. *Id.*, ¶¶ 65, 69-70. Nakagawa's points are thus not "selected vehicle data," but rather processed points representative of safety. Further, Nakagawa does not teach recording the vehicle data itself (as opposed to points) and transferring such unprocessed "selected vehicle data" to the server. *See*

A149, 41:63-42:4. Accordingly, Nakagawa cannot anticipate claim 1 of the '358 patent.

The Board's alternate finding that Nakagawa's "usage data" is "selected vehicle data" rests on the Board's improper dismissal of Progressive's argument as too "narrowly focus[ed]" on paragraph 65's processed safety points. *See* A27-30. The Board found that other paragraphs of Nakagawa – paragraphs 56, 58, and 69 – reference storage of vehicle "usage data" that is distinct from the storage of points in paragraph 65. A28-29 (citing A273, ¶¶ 56, 58, 69). What the Board failed to recognize is that all four paragraphs describe the ***same*** embodiment. A274, ¶ 63 (explaining Figure 3 shows system according to "first embodiment as configured above"); *id.*, ¶ 65 (continuing discussion of Figure 3); A273, ¶ 52 (stating Figure 2 shows "first embodiment"). Accordingly, paragraph 65's description of how "usage data" is processed and stored as points is not "disclosure additional" to paragraphs 56, 58, and 69. Rather, paragraph 65 explains the "data" in those other paragraphs. A274. Thus, paragraph 69's "usage data" is generated via paragraph 65's points. As such, paragraph 69 fails to disclose "selected vehicle data" for the same reasons as the processed points of paragraph 65.

2. Nakagawa Does Not Meet The "Database" Limitation Of Claim 1 Of The '358 Patent

The Board erred in finding that Nakagawa discloses all of the limitations of claim 1 of the '358 patent for the additional reason that Nakagawa does not disclose:

> a database operatively linked to the server to store the selected vehicle data transmitted by the wireless transmitter, the database comprising a storage system remote from the wireless transmitter and the memory comprising records with operations for searching the records and other functions[.]

A149, 41:66-42:4 (hereinafter, "'database' limitation").

a. Nakagawa Does Not Meet The "Database" Limitation Because It Stores Points At The Server Rather Than "Selected Vehicle Data"

Nakagawa does not disclose a "database operatively linked to the server ***to store the selected vehicle data***" because selected vehicle data is never transmitted to Nakagawa's server. A149, 41:66-67 (emphasis added); A274, ¶¶ 65, 69; A3287. As previously explained, Nakagawa discloses a system in which points representative of the "degree of safe operation" are transmitted from the vehicle to the server as "usage data." A274, ¶¶ 65, 69; *see supra* Fact Section II.C, at 11. In Nakagawa, the "server side updates that 'user data' stored in memory that corresponds to received IDs." *Id.*, ¶ 69. Thus, the only data stored in Nakagawa at the server is in the form of processed points – not unprocessed "selected vehicle data." *Id.*, ¶¶ 65, 69; A3377, ¶ 47. Accordingly, Nakagawa does not disclose a

system that meets the "database" limitation's requirement that the database be linked to "the server to store the selected vehicle data transmitted by the wireless transmitter." A3377, ¶ 47; A3287.

b. The Board's Reliance On A "Bare Minimum" Standard To Construe "Database" And "Record" Was Legal Error

The Board legally erred in construing two terms within the "database" limitation – "database" and "record" – based on what the Board viewed as the "bare minimum" qualifications for a "database" and "record," rather than reading the '358 claim language "in light of the specification as it would be interpreted by one of ordinary skill in the art." *See In re Abbott Diabetes Care, Inc.*, 696 F.3d 1142, 1149 (Fed. Cir. 2012) (internal quotation marks and citation omitted); A15-17. The Board's BRI standard for claim construction does not give the Board carte blanche to ignore the intrinsic evidence and instead adopt a construction that consists of the "bare minimum" necessary to meet a claim limitation. *See* 37 C.F.R. § 42.100(b); *In re Skvorecz*, 580 F.3d at 1267 ("The protocol of giving claims their broadest reasonable interpretation during examination does not include giving claims a legally incorrect interpretation."). The broadest ***reasonable*** interpretation does not equate with the "bare minimum" required. Thus, the Board erred in construing "database" and "record" based on its views of the "bare

minimum" qualifications for such elements without regard for the specification and unrebutted expert declaration testimony evidence provided by Progressive.

The Board's "bare minimum" approach to construing the "database" limitation was particularly improper because the Board issued its first constructions of "database" and "record" in its final decision – after Progressive's only opportunity to amend its claims. A15-17; A3198-99. Historically, the PTO has employed a BRI standard as an "examination expedient" to "aid in sharpening and clarifying the claims during the application stage, ***when claims are readily changed***." *In re Skvorecz*, 580 F.3d at 1267 (emphasis added). Here, the Board applied an even more expansive "bare minimum" standard rather than BRI and did so ***after*** there was any possibility that Progressive could amend its claims under the Board's regulations governing CBMPR. *See* 37 C.F.R. § 42.121(a)(1) ("[A] motion to amend must be filed no later than the filing of a patent owner response."); A3222; A3226.

The Board's application of its "bare minimum" reading of "database" and "record" also violates the APA's mandate that Progressive be timely informed of the "matters of fact and law asserted." *See* 5 U.S.C. § 554(b)(3). At institution, the Board indicated it intended to apply the "plain and ordinary meaning of words in their common usage . . . taken in the context of the disclosure of the '358 patent." A3199. The Board's intended approach at institution of applying the BRI

consistent with the intrinsic evidence was consistent with this Court's precedent. *See, e.g.*, *Abbott*, 696 F.3d at 1149 (citing principles of *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc) as applicable under BRI standard). Then, without justification, the Board decided in its final decision – when Progressive had no further opportunity to respond – to instead apply a construction consistent with the "bare minimum" needed to qualify as meeting disputed claim terms.

i. The Board Erred In Construing "Database" To Mean A "Memory" For Storage Only

With respect to "database," the Board's "bare minimum" construction is inconsistent with intrinsic and extrinsic evidence, which indicates that a person of ordinary skill would have understood "database" as used in claim 1 to mean a "file composed of records, each containing fields together with a set of operations for searching, sorting, recombining, and other functions." A3274; A3366, ¶ 21; A3479-81. Contrary to the Board's construction, the ordinary meaning of a "database" read in the context of the '358 patent requires more than a simple memory and includes functions other than just storage.

In construing "database" as a "***memory*** in which the stored data are searchable by the content of a particular field in which the data entries are stored therein" (A16 (emphasis added); A31), the Board failed to recognize that claim 1 contains a distinct "memory" limitation – separate from the "database" limitation. A149, 41:61-62, 41:66-42:4; A4255:7-22. Claim 1 distinguishes between a

database "comprising a storage system remote from the wireless transmitter" and the "memory comprising records . . . ." A149, 42:1-4. Yet, the Board improperly adopted a construction of "database" that appears to be based on the claim's recitation of the separate memory limitation. *See Becton, Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) ("Where a claim lists elements separately, 'the clear implication of the claim language' is that those elements are 'distinct component[s]' of the patented invention.") (brackets in original, citation omitted).

The Board's "bare minimum" approach also resulted in the Board erroneously finding that "functions, such as sorting and recombining are not required" for the claimed "database" – despite intrinsic and extrinsic evidence presented by Progressive suggesting otherwise. A16. First, the claim language itself explicitly requires that the "database" include "records with operations for searching the records and other functions." A149, 42:3-4. Second, the '358 patent explains:

> [A] database 518 retains data from many customers and/or potential customers 206 and/or other drivers/operators. In time, an insurer may use the accumulated underwriting, rating, or driver score information from individual customers 520 to establish relationships between users or user profiles and levels of risk . . . . The algorithms and relationship may be retained in databases 518 remote from or within the unit of risk 200 or device 300.

A135, 14:39-47; A3366, ¶ 21. Thus, the specification describes a database as not only storing data, but providing relationship information and retaining algorithms. *See* A135, 14:39-47; A136, 15:35-43; A147, 37:20-23.

Third, Progressive's expert, Mr. Zatkovich, confirmed that the specification's disclosures were consistent with the ordinary meaning of a "database" as a "file composed of records, each containing fields together with a set of operations for searching, sorting, recombining, and other functions." A3366, ¶ 21.

The Board erred to the extent the Board based its overly broad construction of "database" on its finding that the "'358 patent itself regards arrays as a database." A35. The Board's finding with regard to arrays is based on the '358 patent's description of the particular backend of a network based risk management system depicted in Figure 21. *See* A35; A144, 31:29-51. This description of one component of one embodiment does not broaden "database" to encompass a single one-dimensional array. *See Gen. Elec. Co. v. U.S. Int'l Trade Comm'n*, 685 F.3d 1034, 1037 (Fed. Cir. 2012) ("[A] possibly broader disclosure accompanied by an explicit narrow claim shows the inventor's selection of the narrow claim scope.").

In finding otherwise, the Board also misread the specification's discussion of the possible use of an array in Figure 21. *See* A35. The specification explains that Figure 21 includes a system with multiple databases (2108 and 2114), which may

include two-dimensional arrays "that may be transformed to form new combinations because of relations between the data in the records or other databases, such as hierarchal databases that retain searchable indices that reference distinct portions within that database." A144, 31:36-45. Thus, the "database" in Figure 21 is not a simple two-dimensional array, but instead, at minimum, Figure 21 requires an array coupled with "records or other databases." *Id.*

Moreover, even if the Board's reading were correct, it cannot override the plain language of claim 1, which requires a database that includes plural "records" and has multiple operations, including "searching the records and other functions."[15] A149, 42:3-4; *see Phillips*, 415 F.3d at 1312 ("It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention . . . .'" (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004))). Accordingly, the Board erred in finding that the "'358 patent itself regards arrays as a database." A35.

[15] The Board's interpretation of a database as including an array also renders nonsensical the claim's requirement that the "database . . . search[ ] the ***records***" because ***records*** are not arrays. A149, 41:66-42:4; A3482. The Microsoft Press Computer Dictionary explains: "***Unlike an array***, whose elements all represent the same type of information and are accessed using an index, the elements of a record represent different types of information and are accessed by name." A3482 (emphasis added).

ii. The Board Erred In Construing "Record" To Require Just One Field

The Board's "bare minimum" construction of "record" in its final decision incorrectly expanded the scope of the term such that a record "need have only one searchable field, and that the searchable field need have only one associated attribute, such as 'name' or 'type.'" A17. To the contrary, Progressive presented evidence that the ordinary meaning of a "record" is a "data structure that is a collection of fields (elements), each with its own name ***and*** type." A3366-67, ¶ 23 (emphasis added); A3482; A4255:7-22. Progressive's expert provided declaration testimony that identified support in the specification for construing "record" to require both a name and type field. A3367-68, ¶¶ 24-25. By contrast, the Board cites no evidence – intrinsic or extrinsic – to support broadening the construction of "record" to require "only one associated attribute, such as 'name' or 'type.'" *See* A17. The Board's "bare minimum" construction of "record" is devoid of support and cannot stand. *See ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1090 (Fed. Cir. 2003) (reversing construction of "Internet address" where there was "no support" for the district court's construction).

c. Nakagawa's "Memory" Does Not Meet The "Database" Limitation As Correctly Construed

Under the correct construction of "database" and "record," Nakagawa does not disclose the claimed "database operatively linked to the server to store the

selected vehicle data transmitted by the wireless transmitter, the database comprising a storage system remote from the wireless transmitter . . . . comprising records with operations for searching the records and other functions." A149, 41:66-42:4.

The Board erred in excusing the absence of even a single mention of a "database" in Nakagawa. Nakagawa teaches that "'user data' stored in memory corresponds to received IDs" and is "stored in the memory in the control part 22 on the server side as 'user data.'" A274, ¶ 69. Nakagawa's storage of point information as "user data" could be achieved with a simple array (A3380-81, ¶ 55), which is insufficient to meet the requirements of a "database" with multiple functionalities and that stores records containing both name and type fields. Accordingly, the Board erred in finding that Nakagawa discloses the "database" limitation and anticipates claim 1 of the '358 patent.

3. Nakagawa's Server Does Not Generate A "Rating Factor"

The Board relied on the same misreading of paragraph 65 of Nakagawa to erroneously find that Nakagawa's "operating levels" meet the limitation of claim 1 requiring that the "server is further configured to generate a rating factor based on the selected vehicle data . . ." (hereinafter, "'rating factor' limitation"). A149, 42:10-12; A36-39; *see supra* Argument Section III.B.1.b, at 46. The Board found that the "operating levels" discussed in paragraph 76 in Nakagawa met its

construction of "rating factor."[16] A36. However, paragraph 76 also explains that "operating levels" are "converted into points," which paragraph 65 states are generated onboard the vehicle. A274-755, ¶¶ 65, 76. Thus, both Nakagawa's points and "operating levels" are generated onboard the vehicle – not ***at the server*** as required by claim 1's "rating factor" limitation. A149, 42:10-12.

The Board erred in holding that Nakagawa's "operating levels" are generated at the server as required by claim 1 based on its erroneous finding that it was "not shown that the point scores described in Nakagawa's ¶ 0065 are the same point scores described in Nakagawa's ¶ 0076." A39. To the contrary, Nakagawa indicates that Figures 1-7 and the accompanying text all relate to the ***same*** "first embodiment." *Compare* A272, ¶¶ 36-42 ("first embodiment") *with* ¶¶ 43 ("second embodiment"). Thus, paragraph 65's discussion of points in relation to Figure 2 refers to the same points discussed in paragraph 76's discussion of the screen display of Figure 7. A274, ¶ 65; A275, ¶ 76. Thus, even assuming an "operating level" is a "rating factor," it is not generated at the server as required by claim 1. *See* A3291-93.

[16] While Progressive does not agree with the Board's construction of "rating factor" (A3273; A3343-44, ¶¶ 38-39), that construction does not affect the Board's erroneous finding with respect to Nakagawa.

C. The Board Erred In Finding Claim 9 Obvious Given Claim 9's May 15, 2000 Priority Date

Claim 9 is not obvious in view of Nakagawa for the additional reason that claim 9 is entitled to priority based on the May 15, 2000 filing date of the '650 application for the reasons explained in Argument Section II, *supra*, at 26. A41; A62. As a result, Nakagawa, which was published in 2002, is not prior art to claim 9 under 35 U.S.C. § 102 (*see* A259), and the Board's finding of obviousness based on Nakagawa must be reversed as to claim 9. *See* A41; A60-62; *e.g.*, *In re Koller*, 613 F.2d 819, 825 (Fed. Cir. 1980) (reversing section 102 rejection where the application was entitled to the benefit of an earlier filing date).

CONCLUSION

For the foregoing reasons, Progressive respectfully requests that the Court reverse the Board's final decision holding claims 2-18 of the '358 patent invalid as obvious in view of Nakagawa in combination with other references.

November 14, 2014

Respectfully submitted,

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ADDENDUM

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Trials@uspto.gov
571-272-7822

Paper 78
Entered: February 11, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LIBERTY MUTUAL INSURANCE CO.
Petitioner

v.

PROGRESSIVE CASUALTY INSURANCE CO.
Patent Owner

Case CBM2012-00003
Patent 8,140,358

Before JAMESON LEE, JONI Y. CHANG, and MICHAEL R. ZECHER, *Administrative Patent Judges*.

LEE, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 328(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Liberty Mutual Insurance Company ("Liberty") filed a petition on September 16, 2012, requesting a covered business method patent review of claims 1-20 of U.S. Patent No. 8,140,358 ("the '358 patent") pursuant to section 18(a) of the Leahy-Smith America Invents Act ("AIA").[1] Paper 1 ("Pet."). Because the petition raised a total of 422 grounds of unpatentability against 20 claims, the Board considered the petition as containing redundant grounds, and required Liberty to select a subset of those grounds to pursue in this proceeding. Paper 7. Also, prior to receiving a preliminary response from the patent owner, Progressive Casualty Insurance Company ("Progressive"), the Board issued a decision declining to institute review on 196 of the 422 grounds of unpatentability. Paper 8.

On November 1, 2012, Liberty filed a paper indicating its selection of a subset of grounds of unpatentability to pursue in this proceeding. Paper 9. On November 26, 2012, the Board issued an order which (1) denied those non-selected grounds which previously were not denied in Paper 8, (2) summarized the alleged grounds of unpatentability remaining in this proceeding, and (3) instructed Progressive to respond only to the remaining alleged grounds of unpatentability. Paper 12.

Progressive filed a patent owner preliminary response. Paper 13 ("Prelim. Resp."). Taking into account Progressive's preliminary response, the Board determined that the information presented in Liberty's petition

[1] Pub. L. No. 112-29, 125 Stat. 284, 329 (2011).

demonstrates that it is more likely than not that each of claims 1-20 of the '358 patent is unpatentable. Pursuant to 35 U.S.C. § 324, the Board instituted this trial on February 12, 2013, as to claims 1-20 of the '358 patent. Paper 15 ("Dec.").

During the trial, Progressive filed a patent owner response (Paper 33, "PO Resp."), and Liberty filed a reply to the patent owner response (Paper 39, "Reply"). Oral hearing was held on October 15, 2013.[2]

The Board has jurisdiction under 35 U.S.C. § 6(c). This decision is a final written decision under 35 U.S.C. § 328(a) as to the patentability of claims 1-20 of the '358 patent. For reasons discussed below, Liberty has proved, by a preponderance of the evidence, that claims 2-18 of the '358 patent are unpatentable, but not proved that claims 1, 19, and 20 are unpatentable. Therefore, claims 2-18 are herein cancelled.

A final written decision in Case CBM2013-00009 is entered concurrently with this decision.

A. The '358 Patent

The '358 patent relates to a vehicle monitoring system. Ex. 1001, Title. A data logging device is disclosed, which tracks the operation of a vehicle and/or operator behavior. Ex. 1001, 1:33-34. A processor reads data from an automotive bus that transfers data from vehicle sensors to other

[2] The oral arguments for the instant trial and for CBM2013-00009 were merged and conducted at the same time. A transcript of the oral hearing is included in the record as Paper 76.

components. *Id*. at 1:40-42. The processor writes data that reflects a level of safety to a storage device. *Id*. at 1:42-44. A communication device links the data logging device to a network of computers. *Id*. at 1:44-45.

In the Background of the Invention portion of the disclosure of the '358 patent, preexisting methods for determining cost of insurance are acknowledged, and it is indicated that they gather data from "personal interviews and legacy sources." Ex. 1001, 1:20-21. It is further indicated that such data may be used to classify applicants into actuarial classes that may be associated with insurance rates. *Id*. at 1:21-23. According to the '358 patent, some of such data used to classify risk "is not verified and has little relevance to measuring risk." *Id*. at 1:24-25. It is stated in the '358 patent that the data may not be validated, may be outdated, and may not support new or dynamic risk assessments. *Id*. at 1:27-29. "Systems may accumulate and analyze significant amounts of data and yet discover that the data does not accurately predict losses." *Id.* at 1:25-27.

The claims of the '358 patent are directed to a system that monitors and facilitates a review of data collected from a vehicle that is used to determine a level of safety or cost of insurance. *E.g.*, Ex. 1001, Claim 1.

Claim 1 is the only independent claim. Claims 2-20 each depend, directly or indirectly, from claim 1, which is reproduced below:

> 1. A system that monitors and facilitates a review of data collected from a vehicle that is used to determine a level of safety or cost of insurance comprising:
>
> a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle;

> a memory that stores selected vehicle data related to a level of safety or an insurable risk in operating a vehicle;
>
> a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network and a server;
>
> a database operatively linked to the server to store the selected vehicle data transmitted by the wireless transmitter, the database comprising a storage system remote from the wireless transmitter and the memory comprising records with operations for searching the records and other functions;
>
> where the server is configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects a premium of an insurance policy, safety or level of risk; and
>
> where the server is further configured to generate a rating factor based on the selected vehicle data stored in the database.

B. Related Proceedings

Liberty indicates that the '358 patent was asserted against it in *Progressive Cas. Ins. Co. v. Safeco Ins. Co. of Ill.*, Case No. 1:10-cv-01370 (N.D. Ohio). Pet. 7. The '358 patent also is subject to a covered business method patent review in CBM2013-00009.

C. Covered Business Method Patent

Upon consideration of Liberty's contentions in the petition and Progressive's arguments in the preliminary response, the Board, in the Decision on Institution, determined that the '358 patent is a covered business method patent as defined in section 18(a)(1)(E) of the AIA and 37 C.F.R. § 42.301, because at least one claim of the '358 patent is directed to a

covered business method. Dec. 7-16. The Board concluded that the '358 patent is eligible for a covered business method patent review. *Id*. at 16.

In its patent owner response, Progressive argues that the Board must conduct a claim-by-claim analysis and determine that every challenged claim is directed to a covered business method, before it is authorized, under section 18(a)(1)(E) of the AIA, to review all of the challenged claims. PO Resp. 3-4, n.1. Progressive asserts that the Board exceeded its statutory authority by instituting review of patent claims which the Board has not determined to be directed to a covered business method. *Id*.

Progressive's argument is based on an erroneous statutory construction that would interpret the word "patent" as "claim" in the statutory provision on what is subject to review. We decline to adopt such an interpretation.

As in any statutory construction analysis, we begin with the language of the statute. *Duncan v. Walker*, 533 U.S. 167, 172 (2001); *Crandon v. United States*, 494 U.S. 152, 158 (1990); *In re Swanson*, 540 F.3d 1368, 1374-75 (Fed. Cir. 2008). "In the absence of a clearly expressed legislative intention to the contrary, the language of the statute itself must ordinarily be regarded as conclusive." *United States v. James*, 478 U.S. 597, 606 (1986) (internal quotation marks and citations omitted). "It is well settled law that the plain and unambiguous meaning of the words used by Congress prevails in the absence of a clearly expressed legislative intent to the contrary." *Hoechst AG v. Quigg*, 917 F.2d 522, 526 (Fed. Cir. 1990).

Section 18(d)(1) of the AIA defines the term "covered business method patent" to mean (emphasis added):

> [A] *patent* that claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service, except that the term does not include *patents* for technological inventions.

If Congress intended to limit the availability of the covered business method patent review on a claim-by-claim basis, as urged by Progressive, it could have used the term "claim" rather than "patent." Notably, when specifying the subject matter for review, Congress could have used the language "a *claim* that is directed to a method or corresponding apparatus" rather than "a *patent* that claims a method or corresponding apparatus." Section 18(d)(1) of the AIA sets forth a single threshold based on just one claim—the satisfaction of which qualifies an entire patent as eligible for review—rather than a test which must be applied on a claim-by-claim basis to justify review of each claim.[3] Therefore, a *patent* is eligible for a covered business method patent review if the subject matter of at least one claim is directed to a covered business method. Nothing in the legislative history, or other parts of the AIA, requires us to deviate from the plain meaning of the definition set forth in section 18(d)(1) of the AIA, as proposed by Progressive. Moreover, Progressive has not identified any statutory

[3] *See also* Transitional Program for Covered Business Method Patents – Definitions of Covered Business Method Patent and Technological Invention; Final Rule, 77 Fed. Reg. 48,734, 48,736 (Aug. 14, 2012).

provision or legislative history that requires "each" claim for which trial is instituted to meet the test for a covered business method patent.

With respect to Progressive's argument concerning the Board's determination that at least one claim of the '358 patent is directed to a covered business method, Progressive provides no meaningful explanation as to why the Board's analysis with regard to claim 1 was incorrect. PO Resp. 3-4, n.1.

For the foregoing reasons, we disagree with Progressive that the Board exceeded its statutory authority by instituting a covered business method patent review as to claims 2-20 of the '358 patent. We find no error in the covered business method patent determination set forth in the Decision on Institution.

D. Prior Art Relied Upon

For the grounds of unpatentability over which the Board instituted review of the '358 patent, Liberty relies upon the following prior art:

Nakagawa	U.S. Pub. App. 2002/0128882	Sept. 12, 2002	(Ex. 1005)
Stanifer	U.S. Patent No. 5,243,530	Sept. 7, 1993	(Ex. 1007)
Chang	U.S. Patent No. 5,446,757	Aug. 29, 1995	(Ex. 1008)
Beaverton	U.S. Patent No. 5,210,854	May 11, 1993	(Ex. 1009)
Hunt	U.S. Patent No. 6,957,133	Oct. 18, 2005	(Ex. 1010)
Lowrey	U.S. Patent No. 7,228,211 B1	June 5, 2007	(Ex. 1011)
Bouchard	U.S. Patent No. 5,465,079	Nov. 7, 1995	(Ex. 1014)
Kosaka	Jap. Pub. App. H4-182868	June 30, 1992	(Ex. 1003)

Dimitris A. Scapinakis and William L. Garrison, *Communications And Positioning Systems In The Motor Carrier Industry*, California Partners for Advanced Transit and Highways (PATH), Institute of Transportation Studies, UC Berkeley (January 1, 1992).
("Scapinakis") (Ex. 1016)

QUALCOMM's MSM6500 Multimedia Single-Chip Solution Enables High-Performance Multimode Handsets Supporting CDMA2000 1X, 1xEV-DO and GSM/GPRS, PR Newswire (November 12, 2002)
("Qualcomm MSM6500") (Ex. 1019)

Nakagawa has a filing date of February 27, 2002. Ex. 1005, Cover. Progressive asserts that claims 1, 9, 19, and 20 of the '358 patent are entitled to the filing date of grandparent application 09/571,650, filed on May 15, 2000, and therefore, Nakagawa is not prior art as to claims 1, 9, 19, and 20. In Section II.D. below, we determine that Progressive has shown that claims 1, 19, and 20 are entitled to the May 15, 2000, filing date of grandparent application 09/571,650. Thus, Nakagawa is not prior art as to claims 1, 19, and 20. But we determine that Nakagawa is prior art as to claims 2-18.

E. Grounds of Unpatentability

The Board instituted this covered business method patent review based on the following grounds of unpatentability:

Claims	Basis	References
1, 19, 20	§ 102	Nakagawa
2	§ 103	Nakagawa and Chang
3, 6, 7	§ 103	Nakagawa and Stanifer
4	§ 103	Nakagawa and Beaverton
5, 8	§ 103	Nakagawa and Scapinakis
9	§ 103	Nakagawa and Hunt
10, 11, 13-15	§ 103	Nakagawa and Lowrey
12	§ 103	Nakagawa, Lowrey, and Qualcomm MSM6500
16, 17, 18	§ 103	Nakagawa and Bouchard
19, 20	§ 103	Nakagawa and Kosaka

II. ANALYSIS

A. Claim Construction

In a covered business method patent review, claim terms are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.300(b). Under the broadest reasonable construction standard, claims terms are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). A particular embodiment appearing in the written description must not be read into a claim if the claim language is broader than the embodiment. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). If a feature is not necessary to give meaning to what the

inventor means by a claim term, it would be "extraneous" and should not be read into the claim. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998); *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988).

1. "rating factor"(independent claim 1)

In its petition, Liberty urged that "rating factor" should be construed as meaning "a calculated insurance risk value such as a safety score or a usage discount." Pet. 15:11-14. In support of that assertion, Liberty cited to portions of the specification of the '358 patent. Pet. 15:14-20 (citing Ex. 1001, 22:23-24, 23:41-47, figs. 8 and 10). Progressive, in its patent owner preliminary response, presented no opposition to that proposed interpretation. In the Decision on Institution, the Board adopted Liberty's proposed interpretation, but added the clarification that "an insurance risk value would be a value that reflects an associated level of insurance risk and, therefore, also a corresponding insurance premium." Dec. 6:21-23.

In its patent owner response, Progressive stated the following with regard to the Board's construction of "rating factor":

> A person of ordinary skill in the art would interpret the Board's reference to "insurance risk" to mean expected claims losses, and an "associated level of insurance risk" to describe rating factors associated with actuarial classes.

PO Resp. 9:15-18 (citing Ex. 2005 ¶ 39).

Progressive's argument is misplaced. The Decision on Institution is not a patent disclosure or a scientific research paper. It is not written from

the perspective of one with ordinary skill in the art. Nor is it specifically written for one with ordinary skill in the art. When responding to an inquiry from the Board regarding the usefulness of such an argument and the cited expert testimony from Michael J. Miller (Ex. 2005 ¶ 39), counsel for Progressive attempted to recast the argument as Mr. Miller's interpretation of "rating factor." The pertinent portion of the exchange between the Board and counsel for Progressive is reproduced below:

> JUDGE LEE: Well, our opinion isn't a patent document, it isn't a patent specification, so I'm not sure what the value is for your expert to be interpreting our decision instituting trial from the perspective of one with ordinary skill in the art.
>
> MR. GRIFFITH: I understand, and a completely fair point. So, this is his interpretation of rating factor.

Paper 76, 77:6-11.

The cited testimony of Mr. Miller is reproduced below:

> 39. As mentioned above, an actuarial class inherently has associated with it a rate factor and a risk factor. These are calculated insurance risk values. Accordingly, use of an actuarial class within an insurance context necessarily involves generating and using a rating factor. Use of rate factors and risk factors is necessarily part of any insurance charges or premium determination algorithm for an auto insurance program using actuarial classes.

Ex. 2005 ¶ 39.

The above-quoted testimony does not reflect an opinion of Mr. Miller on what the term "rating factor" means to one with ordinary skill in the art. Mr. Miller is expressing an opinion that if "actuarial classes" are relied on

for calculating an insurance premium, it necessarily involves use of rate factors and risk factors.

Thus, "rating factor" is construed to mean "a calculated insurance risk value such as a safety score or a usage discount," with the clarification that "an insurance risk value would be a value that reflects an associated level of insurance risk and, therefore, also a corresponding insurance premium." The construction is broad, and does not require the use or reliance on "actuarial classes" to generate a rating factor. Nothing from the disclosure of the '358 patent requires importing such an extraneous requirement into the claims. Similarly, "a corresponding insurance premium" refers to a general level of insurance premium, not necessarily any specific dollar amount of premium.

2. "selected vehicle data" (independent claim 1)

Claim 1 recites a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle, and a memory that stores "selected vehicle data" related to a level of safety or an insurable risk in operating a vehicle. Claim 1 further recites a wireless transmitter configured to transfer the "selected vehicle data" retained within the memory to a distributed network and a server. Claim 1 additionally requires a database operatively linked to the server to store the "selected vehicle data" transmitted by the wireless transmitter, and recites that the server is configured to process "selected vehicle data" that represents one or more aspects of operating the vehicle with data that reflects how the "selected vehicle data" affects a premium of an insurance policy, safety or level of

risk. Finally, claim 1 recites that the server is further configured to generate a rating factor based on the "selected vehicle data" stored in the database.

Liberty, in its petition, did not propose an interpretation for "selected vehicle data." Progressive, in its patent owner response, urges that "selected vehicle data" be interpreted as including "certain vehicle data that relates to a level of safety or an insurable risk in operating a vehicle." PO Resp. 10:6-8. The interpretation proposed by Progressive is not meaningful, as claim 1 itself expressly introduces "selected vehicle data" by the phrase: "a memory that stores selected vehicle data *related to a level of safety or an insurable risk in operating a vehicle*." Ex. 1001, (emphasis added). Progressive does not explain any reasoning for according the term "selected vehicle data," itself, the meaning provided by the above-emphasized descriptive phrase that immediately follows the term. We see no appropriate basis for doing so.

Claim terms are not construed properly in a vacuum. It is appropriate to consider the surrounding context. Claim 1 begins by reciting: "a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle." There is no mention in that introductory recitation of the vehicle data being "selected." That recitation is followed by: "a memory that stores selected vehicle data related to a level of safety or an insurable risk in operating a vehicle," which limits the referenced vehicle data to those that are related to a level of safety or an insurable risk in operating a vehicle. From that perspective, the vehicle data has undergone a selection. That could be the only reason why "vehicle data" is prefaced by the word "selected" in the recitation of the memory element. Under the rule

of broadest reasonable interpretation, "selected vehicle data" means nothing substantively more than "certain vehicle data." In that regard, note that the interpretation urged by Progressive also starts with "certain vehicle data," prior to repeating what already is specified elsewhere in the claim.

Our interpretation is consistent with the disclosure of the '358 patent. For instance, the disclosure states that vehicle data elements monitored and/or recorded include raw data elements, calculated data elements, and derived data elements. Ex. 1001, 7:11-13. It is evident that the term is meant to be inclusive, not restrictive. Thus, we do not limit "selected vehicle data" to just raw data sensed by sensors. Instead, it covers processed or calculated vehicle data. In summary, we reiterate that "selected vehicle data" means "certain vehicle data," and note that it covers vehicle data transformed by processing or calculation. The particular forms of processing and calculation referenced in the specification merely are examples, and we do not consider them as limitations on the covered transformation, under the rule of broadest reasonable interpretation.

3. "database" (independent claim 1)

Liberty, in its petition, does not offer an interpretation for "database." Progressive, in its patent owner response, states that the term "database" is used in its ordinary sense in the disclosure of the '358 patent. PO Resp. 10:10-11. Progressive asserts, citing Microsoft Press Computer Dictionary, that "database" means "a file composed of records, each containing fields together with a set of operations for searching, sorting, recombining, and

other functions." PO Resp. 10:15-19 (citing Microsoft Press Computer Dictionary 129 (3d ed. 1997) (Ex. 2010) (internal quotation marks omitted)). The assertion is supported by the declaration testimony of Ivan Zatkovich (Ex. 2007 ¶ 21), and is not specifically disputed by Liberty in its reply.

We generally agree with Progressive's proposed interpretation, except that under the rule of broadest reasonable interpretation, we determine that a basic database need not have all of the functions of searching, sorting, recombining, and additional unspecified "other functions." Progressive's expert witness, Mr. Zatkovich, does not explain where a line would be drawn, that denotes the bare minimum for a memory to qualify as a database. On the evidence before us, we construe a database as "a memory in which the stored data are searchable by the content of a particular field in the data entries stored therein." Other more sophisticated functions, such as sorting and recombining are not required.

4. "*record*" (*independent claim 1)*

Liberty, in its petition, does not offer an interpretation for "record." Progressive, in its patent owner response, states that the term "record" should be accorded its ordinary meaning when used in the context of a database record, as is the case in the disclosure of the '358 patent. PO Resp. 11:3-4. Citing Microsoft Press Computer Dictionary, Progressive asserts that "record" means "[a] data structure that is a collection of fields (elements) each with its own name and type." PO Resp. 11:4-7 (citing Microsoft Press Computer Dictionary 399 (3d ed. 1997) (internal quotation

marks omitted)). The assertion is supported, partially, by the declaration testimony of Ivan Zatkovich, Ex. 2007 ¶ 23. We say partially supported because Mr. Zatkovich refers to what was generally known, or the standard format for a database record. Mr. Zatkovich does not explain the bare minimum for qualifying a data entry as a database record. It is not clear from Mr. Zatkovich's testimony (1) how many separate fields must a record include, and (2) whether each field must have both a "name" and "type" attribute.

We agree with Progressive's proposed interpretation, except that under the rule of broadest reasonable interpretation, we determine that a record need have only one searchable field, and that the searchable field need have only one associated attribute, such as "name" or "type." Thus, a "record" in the context of the database recited in claim 1 is "a data entry item, having a structure that includes at least one searchable field with an associated attribute, such as name or type."

B. Alleged Anticipation of Claims 1, 19, and 20

Liberty asserts that claims 1, 19, and 20 are unpatentable, under 35 U.S.C. § 102, as anticipated by Nakagawa. Pet. 22, 70, 76. In support of that asserted ground of unpatentability, Liberty provides detailed explanations as to how each claim element, arranged as is recited in these claims, is disclosed by Nakagawa. Pet. 22-26, 70-71, 76. Liberty's petition also relies on the declaration testimony of Mr. Scott Andrews (Ex. 1025).

Upon review of Liberty's petition, Progressive's response, and Liberty's reply, we determine that Liberty has demonstrated, by a preponderance of the evidence, that each element of claims 1, 19, and 20, arranged as it is recited in the claims, is disclosed by Nakagawa. However, because claims 1, 19, and 20, are entitled to an effective filing date of May 15, 2000, as determined in Section II.D. below, Nakagawa is not prior art to claims 1, 19, and 20. Therefore, we determine that claims 1, 19, and 20 are not unpatentable, under 35 U.S.C. § 102, as anticipated by Nakagawa.

Nevertheless, we proceed to discuss how each element of independent claim 1 is disclosed by Nakagawa, because those findings are the basis for the conclusion of obviousness of dependent claims 2-18 over respective prior art combinations, including Nakagawa as disclosing all of the elements of independent claim 1.

1. Nakagawa

Nakagawa's disclosed invention relates to a vehicle insurance premium calculation system, onboard apparatus, and server apparatus. Ex. 1005, Title. The system includes a usage status detection means for detecting the usage status of a vehicle, a data input means for inputting data relating to the maintenance or management of a vehicle, and an insurance premium calculation means for calculating vehicle insurance premium based on detection results and inputted data. Ex. 1005, Abst; ¶ 0006.

In its description of related art, Nakagawa refers to another insurance premium calculation system, that is based on the monitoring, recording, and communication of data showing the operating characteristics of the operator

and vehicle, and that retroactively adjusts the insurance premium by linking operating characteristics to prescribed safety standards, as well as sets the future premium. *Id.* at ¶ 0004. That other system includes a process that monitors a multiplicity of data elements showing the actions of operators or how the car is being operated. *Id*. Selected data elements having a prescribed relationship with a prescribed safety standard are recorded, for determining any additional charge or discount that should be applied to the basic premium, when the recorded data are processed in an insurance company profile. *Id*.

With regard to the related art, Nakagawa states that it has been difficult for insurance companies to prove that a vehicle has been maintained and serviced properly because the premium is calculated based solely on information relating to the vehicle's operation and history of use of safety equipment. Ex. 1005 ¶ 0005. In that regard, Nakagawa states:

> That is, it was not possible to calculate car insurance premiums that took into account whether or not components such as tires and brake pads, used to run a vehicle safely, have been serviced or maintained. This system aims to calculate appropriate vehicle insurance premiums by taking into account the maintenance and servicing history of the vehicle.

Id. Thus, Nakagawa discloses a system and method for calculating insurance premium based on both (1) detected data indicating the usage status of a vehicle as detected by a detecting means, and also (2) inputted data relating to vehicle servicing or maintenance. Ex. 1005 ¶¶ 0006, 0007.

In that regard, Nakagawa describes that the usage status of a vehicle refers to the way in which a vehicle is operated by the driver or to the installation status of equipment for protecting passengers. Ex. 1005 ¶ 0007.

Nakagawa's Figure 1 is reproduced below:

Fig.1

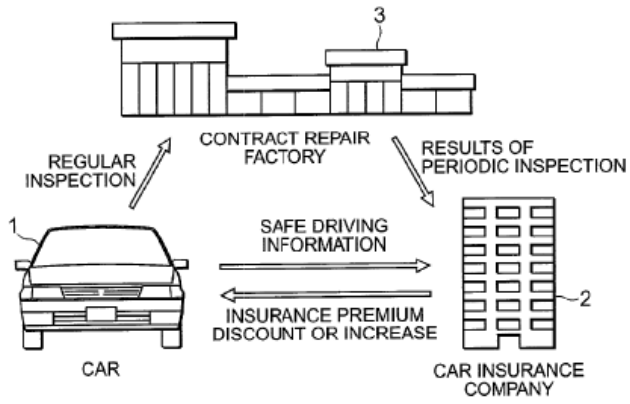
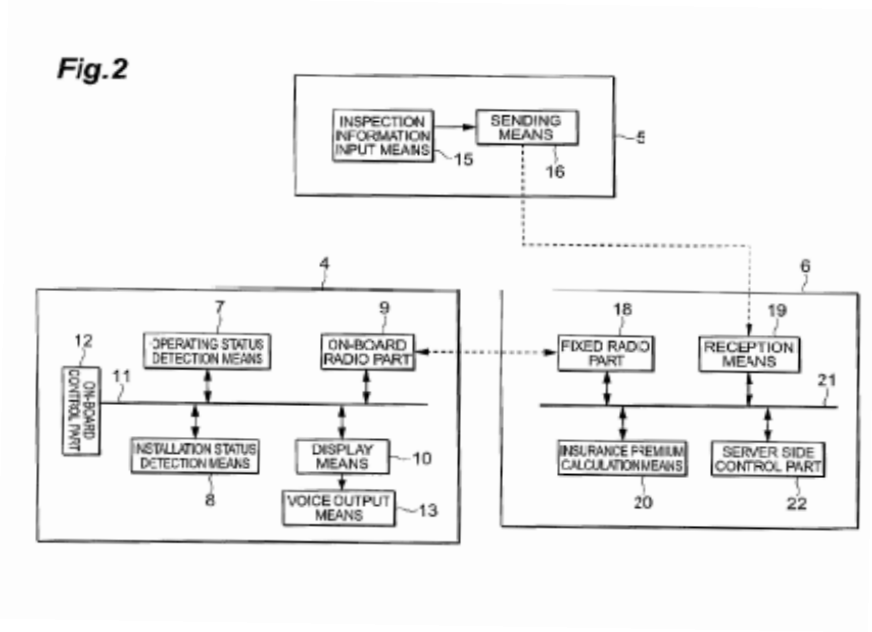


Figure 1 illustrates a broad conceptual diagram of Nakagawa's system and method for calculating vehicle insurance premium. Ex. 1005 ¶¶ 0036, 0048. An onboard apparatus is installed on the vehicle, which collects, via various sensors, information relating to the driver's operation of the vehicle, and information relating to the installation status of safety equipment. Ex. 1005 ¶ 0048. That collected information is transmitted from onboard the vehicle to the insurance company via radio communication. *Id*. Contract repair factory 3 is aware of whether or not the user of the vehicle has serviced the vehicle regularly at the facility. Ex. 1005 ¶ 0049. When vehicle inspection and service is carried out at contract repair factory 3, that information is sent from contract repair factory 3 to the insurance company, via either radio or wired communication. *Id*. The insurance company

calculates the insurance premium, based on the information transmitted from the vehicle and the information transmitted from the contract repair factory, in the form of an increase or decrease of a base premium. Ex. 1005 ¶ 0050. Information relating to any adjustment in premium is transmitted via radio communication from the insurance company to the vehicle, and then displayed for viewing by the user of the vehicle. *Id.*

Figure 2 of Nakagawa is reproduced below:



The technical components of one embodiment of Nakagawa's system for calculating vehicle insurance premiums are illustrated in Figure 2. Ex. 1005 ¶¶ 0037, 0052. They include onboard apparatus 4 in the vehicle, maintenance data management means 5 in contract repair factory 3, and server apparatus 6 at the car insurance company. Ex. 1005 ¶ 0052. Onboard apparatus 4 includes operation status detection means or detector 7 that detects how a car is being operated by a user, installation status detection

means or detector 8 that detects whether or not equipment for protecting passengers has been installed, onboard radio part 9 that sends and receives data by radio, and display means 10 that displays data. Ex. 1005 ¶ 0053. Those components are all connected via control bus 11 to onboard control part 12, which is a processor. *Id*. The disclosure of Nakagawa describes the operating status of a vehicle by a user, as well as the installation status of equipment for protecting passengers, as "vehicle usage status." *Id*.

The following description conveys the nature of the vehicle usage status information collected by operation status detection means 7:

> The operating status detection means **7** consists of various sensors. It detects how the accelerator is used by the user of car 1, the speed at which the car is driven, how the anti-lock braking (or brake) system (ABS) is working, the time, changes in engine revolutions, transmission settings (parking, reverse, drive, neutral), and use of left and right indicators and of headlamps. It then outputs this information as data. It can detect the current location of a car using a global positioning satellite (or system) (GPS) and uses a G sensor to detect deceleration and acceleration and braking.

Ex. 1005 ¶ 0054.

The following description conveys the nature of the vehicle usage status information collected by installation status detection means 8:

> The installation status detection means **8** consists of various sensors that detect the installation status of safety equipment. It detects seatbelts installation status, child seat installation status, and the position in which head rests are used and outputs information as data.

Ex. 1005 ¶ 0055.

Nakagawa states that onboard control part 12 contains a memory, which is not shown in the drawings. Ex. 1005 ¶ 0058. Nakagawa further states: "[t]his memory stores data collected by operating status detection means **7** and installation status detection means **8** and data received via radio by on-board radio part **9**." *Id*. Also, according to the Nakagawa, data collected by operating status detection means 7 and installation status detection means 8 are sent to radio part 9, via control bus 11 under the control of onboard control part 12, and radio part 9 sends such data to server apparatus 6 at insurance company 2. Ex. 1005 ¶ 0056. Server apparatus 6 calculates an insurance premium based on data received from onboard apparatus 4 and maintenance data management means 5. Ex. 1005 ¶ 0061.

Nakagawa's Figure 5 is reproduced below:

Fig.5

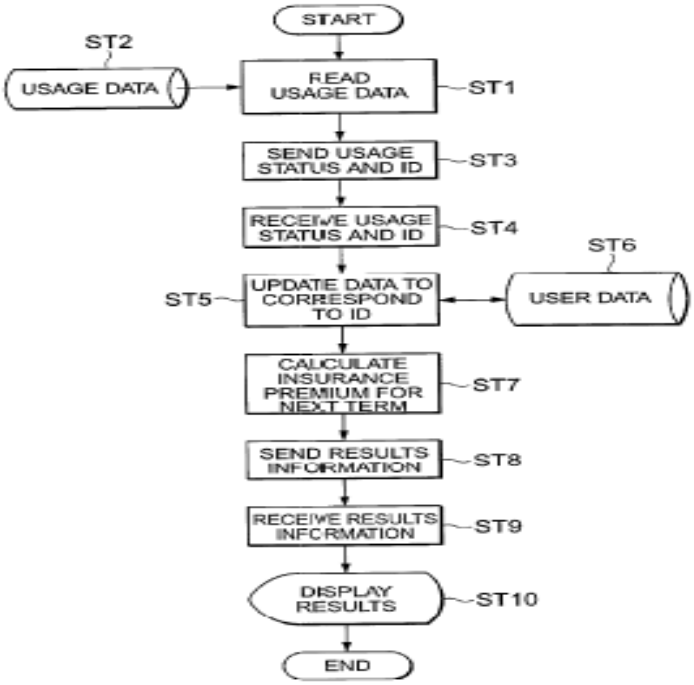


Figure 5 is a flowchart illustrating the operation in which vehicle insurance premium calculation means 20 in server apparatus 6 calculates vehicle insurance premiums. Ex. 1005 ¶ 0069. Specifically, in onboard apparatus 4, "usage data" is read from the memory in onboard control part 12, and onboard radio part 9 sends the data—read from memory—together with an associated User ID, to server apparatus 6 located at the insurance company. Ex. 1005 ¶ 0069. Thereafter, control part 22 at the insurance company updates the user data stored in memory, at the insurance company, that correspond to the received User ID, with the data received from onboard apparatus 4. *Id*. In that regard, Nakagawa describes that the latest data collected by onboard apparatus 4 and the latest data collected at contract repair factory 3 are stored within control part 22 at the insurance company as user data. *Id*. Next, insurance premium calculation part 20 reads the "user data," corresponding to a User ID, in the memory of control part 22, and calculates the insurance premium applicable to the associated user for the next insurance term. Ex. 1005 ¶ 0070.

Nakagawa describes that the insurance premium is calculated by determining a discount or a surcharge based on a prescribed standard value. Ex. 1005 ¶ 0072. For instance, when user data indicate speeding, non-use or misuse of seatbelts, or worn brake pads, the calculation will result in an increased premium. *Id*. When user data indicate appropriate driving, appropriate use of seatbelts, and timely replacement of brake pads and hoses, the calculation will result in a discount from the standard premium. *Id*. The results of insurance premium calculation are sent, by radio, to onboard

apparatus 4, and display means 10 displays the calculated insurance premium. Ex. 1005 ¶ 0073.

2. Discussion

To establish anticipation, each and every element in a claim, arranged as is recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc*., 545 F.3d 1359, 1369 (Fed. Cir. 2008); *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). Our analysis will focus on each of the three deficiencies alleged by Progressive in its patent owner response with regard to claim 1.

Progressive identifies three elements of claim 1, as not disclosed by Nakagawa. Progressive asserts that Nakagawa does not disclose that (a) "selected vehicle data," retained within memory, is transferred to a distributed network and a server; (b) a database operatively linked to the server; and (c) the server being configured to generate a rating factor.

a. Selected Vehicle Data, Retained within Memory, is Transferred

As correctly noted by Progressive (PO Resp. 20-21), claim 1 recites (1) a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle; (2) a memory that stores selected vehicle data related to a level of safety or an insurable risk of operating the vehicle; and (3) a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network and a server.

Progressive asserts, however, that there is no disclosure in Nakagawa that "selected vehicle data" is stored within memory and transferred by the

wireless transmitter to a network and server. PO Resp. 21:8-10. Citing to the declaration testimony of Ivan Zatkovich (Ex. 2007 ¶¶ 39-43) for support, Progressive states that although Nakagawa does collect vehicle data from a control bus, using various sensors to detect how a user is operating the car, Nakagawa does not disclose storing "selected vehicle data" in memory and transferring that "selected vehicle data" by wireless transmitter. PO Resp. 21:11-15. For reasons discussed below, the argument is unpersuasive.

It is true that, according to claim 1, the selected vehicle data that is stored in memory has to be related to a level of safety or an insurable risk of operating the vehicle. It does not matter whether that characteristic of the stored data is derived from the meaning of "selected vehicle data," as argued by Progressive, or from a separate limitation recited in the claim, as we have determined above in the section of the decision on claim interpretation.

What Progressive argues is that Nakagawa does not disclose storing in memory, or transferring to a distributed network and a server, certain vehicle data which are related to a level of safety or an insurable risk of operating the vehicle. The argument is unpersuasive. It is contradicted by our findings on Nakagawa's disclosure, as discussed below.

Nakagawa describes the operating status of a vehicle by a user, as well as the installation status of equipment for protecting passengers, as "vehicle usage status." Ex. 1005 ¶ 0053. Nakagawa describes that the usage status of a vehicle refers to the way in which a vehicle is operated by the driver or the installation status of equipment for protecting passengers. Ex. 1005 ¶ 0007. Nakagawa describes that its vehicle insurance premium

calculation system comprises a usage status detection means that detects the usage status of a vehicle, a data input means through which data relating to vehicle servicing or maintenance is input, and an insurance premium calculation means that calculates vehicle insurance premiums based on the detection results and input data. Ex. 1005, Abst.; ¶ 0006.

Thus, whether or not expressly referred to as vehicle "usage data," the information detected by the usage status detection means, which reflects the "usage status" of the vehicle, is vehicle "usage data." This usage status detection means, described in the Summary of the Invention portion of Nakagawa, is broken down into two parts in the Description of Preferred Embodiments portion of Nakagawa, i.e., operating status detection means and installation status detection means. Ex. 1005 ¶¶ 0053-55.

Nakagawa's operating status detection means detects how a car is operated by a user, such as how the accelerator is used, how fast is the vehicle being driven, and how the anti-lock braking system or braking system is working, whereas Nakagawa's installation status detection means detects the installation status of safety equipment such as seatbelts, child seats, and head rests. *Id*. Thus, the data collected by Nakagawa's operating status means and Nakagawa's installation status detection means are related to a level of safety or an insurable risk of operating the vehicle, and thus, constitute "selected vehicle data" related to a level of safety or an insurable risk of operating the vehicle.

Nakagawa describes that onboard control part 12 includes a memory, which stores the data collected by the operating status detection means and

the installation status detection means. Ex. 1005 ¶ 0058. Nakagawa also describes that data collected by the operating status detecting means and installation status detection means are sent to onboard radio part 9, which sends the information to an insurance company. Ex. 1005 ¶ 0056.

In another part of its disclosure, Nakagawa describes, in connection with the overall operational flowchart illustrated in Figure 5, that vehicle "usage data" is read from the memory within onboard control part 12, and radio part 9 sends the usage data, thus read, together with an associated User ID, to server apparatus 6 at the insurance company. Ex. 1005 ¶ 0069. The operational flowchart of Figure 5 illustrates no other transmission from the vehicle.

Progressive's argument (PO Resp. 21:18 to 22:6), and the supporting testimony of its expert witness Mr. Zatkovich (Ex. 2007 ¶¶ 40, 41), both narrowly focus on only one paragraph of Nakagawa's disclosure, i.e., ¶ 0065, which is reproduced below:

> In step **S2**, the on-board control part **12** determines whether the operation and installation statuses of a vehicle are safe or dangerous based on data collected from operating status detection means **7** and installation status detection means **8**. When it determines that both the operating and installation statuses are safe, the degree of safe operation is recorded in point form (step **S3**). When it determines that the statuses are dangerous, the danger status is recorded in point form (step **S4**). The data stored in steps **S3** and **S4** are stored in the memory provided in the on-board control part 12 as "usage data" (step **S5**).

We agree with Liberty (Reply 4:4 to 5:9) that the above-quoted paragraph is disclosure additional to all the description in Nakagawa of collecting information on vehicle usage status, storing them, and transferring them. Note, in particular, the description in ¶ 0056 of Nakagawa that data collected by the operating status detection means and the installation status detection means are sent to the onboard radio for transfer to the insurance company, and the description in ¶ 0058 that a memory in onboard control part 12 stores the data collected by the operating status detection means and the installation status detection means.

Progressive does not explain adequately why information about the usage status of the vehicle, as collected by what Nakagawa refers to in its Summary of the Invention as usage status detection means, implemented in Nakagawa's preferred embodiments as operating status detection means and installation status detection means, are not vehicle "usage data."

Progressive also does not explain adequately why the description in ¶ 0068 of Nakagawa that vehicle "usage data" is read from memory and sent, when "thus read," by radio part 9 to the insurance company, refers only to the point scores described in ¶ 0065 of Nakagawa. Progressive does not explain adequately why vehicle "usage data" does not cover data collected by the operating status detection means and the installation status detection means, which are stored in memory as described in ¶ 0058 of Nakagawa.

Nakagawa's ¶ 0065 expressly labels the point scores as "usage data." That, however, does not change the fact that information collected by a "usage status detection means," implemented in Nakagawa as operating

status detection means and installation status detection means, about the "usage status" of the vehicle, is vehicle "usage data." The point scores, by their nature, are even one step more removed from being usage data, than the collected data themselves, because of the application of additional processing to produce the point scores. The collected data does not require express labeling to constitute "usage data."

Furthermore, Nakagawa's ¶ 0069 does not follow immediately from ¶ 0065, and does not expressly refer to the point scores noted in ¶ 0065. Nakagawa's ¶ 0069 discusses an overview of the entire system for calculating insurance premium by beginning with the language: "Next, the operation in which the server apparatus 6 calculates the car insurance premiums will be explained. FIG. 5 is a flowchart that shows the operation in which the car insurance premium calculation means 20 in server apparatus 6 calculates car insurance premiums." The only transmission of data from the vehicle to the insurance company, as illustrated in Figure 5, is vehicle usage data and an associated User ID. That fact logically reflects that the reference in Nakagawa's ¶ 0069 to reading usage data from memory and sending data, thus read, to the insurance company, is directed not only to the point scores discussed in ¶ 0065, but also to the usage status information collected by the operating status detection means and the installation status detection means. In that connection, Progressive has not offered a reasoned explanation as to why that is not the case.

In any event, on the basis of our construction of the claim phrase "selected vehicle data" as sufficiently broad to cover vehicle data

transformed by processing or calculation, we agree with Liberty's contention that the point scores described in ¶ 0065 of Nakagawa themselves constitute "selected vehicle data." Therefore, for that reason as well, Progressive's argument that the "usage data" referred to in Nakagawa's ¶ 0068 are merely the point scores described in Nakagawa's ¶ 0065, are unavailing. The point scores are stored in memory, read from memory, and sent, thus read, to server apparatus 6 at the insurance company through radio part 9.
Ex. 1005 ¶ 0068.

b. A Database Operatively Linked to the Server

Claim 1 requires that there be a database operatively linked to the server to store the selected vehicle data transmitted by the wireless transmitter, and specifies that the database comprises records with operations for searching the records and other functions. The language is broad, particularly with respect to "and other functions," which is met simply with storage and retrieval functionality, apart from searching.

With regard to the term "database," we have construed it as "a memory in which the stored data are searchable by the content of a particular field in the data entries stored therein." We have construed the term "record," in the context of the database, as "a data entry item, having a structure that includes at least one searchable field with an associated attribute, such as name or type." Therefore, a memory in Nakagawa's disclosed server would be a "database," if its data entries have a structure that includes at least one searchable field, and if the memory is searchable by the content within that field.

Citing the testimony of its expert witness Scott Andrews (Ex. 1025 ¶¶ 22, 25, 35, 36), Liberty, in its petition, asserts that a person of ordinary skill in the art would have recognized that Nakagawa's disclosure of storing selected vehicle data in a memory on the server, and updating that stored data corresponding to an ID, explicitly teaches, or inherently discloses, use of a database. Pet. 25:2:18-24. Progressive, on the other hand, cites the testimony of its expert witness Mr. Ivan Zatkovich (Ex. 2007 ¶¶ 35, 36, 49, 55), and asserts that the Nakagawa disclosure, relied on by Liberty, merely discloses a generic memory, which may or may not be a database, and only describes the general updating of stored data within the memory that have corresponding User IDs also transferred from the vehicle. PO Resp. 24:15-18, 25:1-3.

Progressive asserts that general disclosure of "updating" stored data, which corresponds to a received User ID, does not teach storage of records in a database or operations for searching the records. PO Resp. 25:1-6. According to Progressive, Nakagawa does not describe the format, if any, in which any data is stored in the memory within the server. PO Resp. 24:18-20. In that connection, Mr. Zatkovich testifies that the step of adding a corresponding User ID to the data being transferred from the vehicle to the remote server "does not introduce any database requirements for that data." Ex. 2007 ¶ 49.

For reasons discussed below, Liberty has established that the memory in Nakagawa's server apparatus 6 is a database. We credit the testimony of Mr. Andrews over that of Mr. Zatkovich. According to Mr. Andrews,

Nakagawa discloses storing, in the server, the corresponding User ID together with the vehicle data. Ex. 1025 ¶ 36. We do not take Mr. Andrews's testimony as meaning that the User ID must be stored at a location contiguous to the location storing the corresponding vehicle data. That is not Mr. Andrews's testimony. Rather, Mr. Andrews testifies that, in Nakagawa, the User ID also is stored and that a link is maintained between the stored vehicle usage data and the corresponding user ID. *Id*. That testimony supports Liberty's contention that Nakagawa's server memory is searchable by User ID.

Paragraph 36 of the declaration of Mr. Andrews is reproduced below:

> Nakagawa discloses storing a driver's vehicle data ("usage data") in a memory on a server along with an ID for that driver. *Id*. at ¶ [0069]. Nakagawa also describes updating the driver's usage data stored in the server's memory that corresponds to the ID. *Id*. These data are thus stored so as to create a correspondence between a driver's stored "usage data" and an ID. Such a correspondence would be understood by one skilled in the art as indicating a database.

Ex. 1025 ¶ 36. Mr. Andrews also testifies that for the stored user data to be recorded in memory in a way that can be located and retrieved later based on a corresponding User ID, a person of ordinary skill in the art would understand that such data are stored in a form that maintains a link between the user data and the corresponding User ID. Ex. 1034 ¶ 22.

Mr. Andrews further testifies that Nakagawa discloses the functionality of searching the user data within the server memory. Ex. 1034 ¶¶ 28, 31. Mr. Andrews refers to Nakagawa's disclosure that control part 22

"updates" the user data recorded in the server memory that corresponds to the received ID, and then explains that, to update such stored data keyed to a particular user, the server necessarily must locate and retrieve, i.e., search, one or more specific records from among the many records so that changes can be made to a particular driver's data. Ex. 1034 ¶ 28.

The above-noted testimony of Mr. Andrews is persuasive. Because the data entries corresponding to particular User IDs have to be updated later, it is logical that the User IDs have to be stored, that a link has to be maintained between each data entry and its corresponding User ID, and that the entries are searchable by User ID. Because of the presence of a link between each User ID and the data corresponding to that User ID, each data entry item has a field, the content of which is the User ID, which represents a name for the corresponding data entry.

Mr. Zatkovich does not explain sufficiently his testimony (Ex. 2007 ¶ 49) that adding a corresponding User ID to the vehicle data sent by onboard radio part 9 to server apparatus 6 does not introduce any disclosure about a database in server apparatus 6. For instance, he does not explain why a link need not be maintained between each User ID and the corresponding user data, such that each data entry item includes a field containing the corresponding User ID, by which the data entry is searchable. Mr. Zatkovich states that data need not be stored as records to be stored in memory. Ex. 2007 ¶ 49. However, Mr. Zatkovich's reference to a "record" is based on Progressive's proposed construction of a "record," and not on the Board's construction of "record." Mr. Zatkovich does not refute adequately

all the evidence discussed above supporting a finding that Nakagawa discloses storing both vehicle data, as well as the User ID to which the vehicle data corresponds, and maintaining a link between each vehicle data item and its corresponding User ID. That disclosure sufficiently accounts for the requirements of a database "record." There is no requirement that the actual data and its corresponding User ID be stored in contiguous physical locations.

Mr. Zatkovich testifies that Nakagawa's server functionality can be achieved with simple arrays, which use indexes to reference a value stored in an array, because what are stored in Nakagawa's server are merely point values rather than different types of data. Ex. 2007 ¶ 55. For several reasons, that testimony is not helpful for Progressive's contention that Liberty has not shown that Nakagawa's server memory is a database.

First, we have determined above that Nakagawa's onboard device does not merely send certain point values, converted from vehicle data, but also sends different types of vehicle data to the server apparatus. Second, Progressive has not shown why the combination of an array and its index does not constitute a "database" under the Board's construction of the term. In that regard, Progressive does not explain why it is not the case that the use of an index to reference the array contents indicates that the User IDs are stored in the index, that the index holds the name field linked to each of the data entries in the array, and that the array is searchable by the field in the index. Third, the '358 patent itself regards arrays as a database. Ex. 1001, 31:36-41.

For all of the foregoing reasons, Liberty has shown, not by principles of inherent disclosure, but direct disclosure, that Nakagawa's server apparatus 6 is operatively linked to a database, as is required by claim 1 of the '358 patent.

c. Server Configured to Generate a Rating Factor

Claim 1 recites that "the server is further configured to generate a rating factor based on the selected vehicle data stored in the database." Progressive's argument that Nakagawa's server does not generate any rating factor is unpersuasive.

Progressive contends that a "rating factor" must be tied, somehow, to expected claim losses or actuarial classes. PO Resp. 29. That argument is unpersuasive, because it presents an issue of claim interpretation, and we have rejected Progressive's position on the meaning of "rating factor." We have construed "rating factor" to mean "a calculated insurance risk value such as a safety score or a usage discount," where "an insurance risk value would be a value that reflects an associated level of insurance risk and, therefore, also a corresponding insurance premium." In that context, "a corresponding insurance premium" refers to a general level of insurance premium, not necessarily any specific dollar amount of premium.

Liberty, in its petition (Pet. 26:2:12-37), correctly regards the aggregate "operating levels" described in Nakagawa's ¶ 0076 as constituting a "rating factor." Nakagawa's ¶ 0076 is reproduced below:

> **FIG.7** shows an example of a screen display in step **ST10** in **FIG. 5**. Here, user operating levels and discount rates for insurance premiums up until the previous month are shown in graph form based on data relating to the driving operation of the car from the start of the month to the present. That is, at the end of each month, the evaluation of operating levels for one month is calculated in numeric form and displayed to reflect the amount by which the insurance premium will be multiplied. The operating levels show driving techniques and the level of safe driving as points which are then evaluated as numbers. For example, in the evaluation of driving techniques, G sensors installed in a car are used to detect whether or not deceleration occurs smoothly without any locking of tires and whether or not curves in the road are handled without unreasonable steering. The findings are then converted into points. In the evaluation of safe driving, inter-car distance sensors are used to detect whether or not a safe distance is being maintained between vehicles to suit the running speed. The finding is then converted into points. The operation level, as shown in points, is displayed as a bar graph as shown in **FIG. 7**. It can be seen that operating levels improved in September when compared to May. The discount rates applied to the insurance are displayed in a broken line graph. Thus it can be seen that as operating levels improve, the discount applied to the insurance increases and the car insurance premium payable by the user decreases.

Ex. 1005 ¶ 0076.

The above-quoted text refers to a sample screen display according to step ST10 in Nakagawa's Figure 5, which states: "DISPLAY RESULTS." Step ST7 states: "CALCULATE INSURANCE PREMIUM FOR NEXT TERM." Ex. 1005, Fig. 5. Step ST8 states: "SEND RESULTS INFORMATION." *Id.* Step ST9 states: "RECEIVE RESULTS INFORMATION." *Id.* Nakagawa describes that in step ST7, it is insurance

premium calculation part 20 on the server side, which calculates the insurance premium. Ex. 1005 ¶ 0070. Nakagawa describes that when insurance premium calculation part 20 on the server side has calculated the car insurance premium, it sends the results, in step ST8, to onboard apparatus 4. Ex. 1005 ¶ 0073. Nakagawa further describes that display means 10 on the vehicle then displays the received information. *Id*. Another portion of Nakagawa also describes that insurance premium is calculated on the server side, sent back to the vehicle, and then displayed onboard. Ex. 1005 ¶ 0062.

Based on the foregoing, it is the server apparatus which generates the operating levels and calculates an appropriate insurance premium on the basis of that operating level. Progressive, however, argues that it is the onboard apparatus which determines the operating levels referred to in Nakagawa's ¶ 0076. The argument is unpersuasive.

Progressive relies on the testimony of Mr. Zatkovich (Ex. 2007 ¶¶ 39, 40), which narrowly focuses on ¶ 0065 of Nakagawa's disclosure, as it has with regard to its earlier argument that Nakagawa does not send selected vehicle data to a remote server. PO Resp. 28. As we have discussed above, Nakagawa's ¶ 0065 does describe the generation, onboard the vehicle, of certain point scores reflecting the safety or danger status of the vehicle. But Progressive has not shown that negates or replaces the processing described in Nakagawa's ¶ 0076 in connection with the calculation of an insurance premium, which occurs within server apparatus 6. Indeed, ¶ 0076 of Nakagawa refers to the actual evaluation of data and subsequent conversion

of the findings of the evaluation into point scores, and not simply reading certain point values already generated by the onboard apparatus and transmitted to the server.

Furthermore, Liberty correctly notes that the point scores referred to in Nakagawa's ¶ 0076 are aggregate values over an extended time period, e.g., one month, which can affect or influence the level of insurance premium, whereas that is not the case for the individual point scores referred to in Nakagawa's ¶ 0065. In any event, Progressive has not shown that the point scores described in Nakagawa's ¶ 0065 are the same point scores described in Nakagawa's ¶ 0076, or that the process described in Nakagawa's ¶ 0076 refers to the onboard procedure described in Nakagawa's ¶ 0065.

3. Conclusion

For reasons discussed above, Liberty has shown, by a preponderance of the evidence, that each element of independent claim 1, arranged as is recited in the claim, is disclosed by Nakagawa.

C. Alleged Obviousness of Claims 2-20

Each of claims 2-20 depend, directly or indirectly, from claim 1. Each of claims 2-20 is subject to an alleged ground of unpatentability based on Nakagawa and one or more additional prior art references. However, because claims 19 and 20 are entitled to an effective filing date of May 15, 2000, as determined in Section II.D. below, Nakagawa is not prior art to

claims 19 and 20. Therefore, we determine that claims 19 and 20 are not unpatentable, under 35 U.S.C. § 103, over Nakagawa and Kosaka.

With regard to dependent claims 2-18, Liberty's petition contains arguments and evidence supporting each assertion of obviousness. Progressive has not presented rebuttal arguments directed to the alleged unpatentability of claims 2-18, on the various obviousness grounds over which we instituted review of claims 2-18, except to argue that Nakagawa does not disclose all the elements of independent claim 1. That argument already has been considered and rejected above in the discussion concerning the alleged anticipation of claim 1 by Nakagawa.

The level of ordinary skill is reflected by the prior art of record. *See, e.g.*, *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). We have considered the arguments and evidence before us, and conclude that Liberty has demonstrated, by a preponderance of the evidence, that claims 2-18 are unpatentable for obviousness, under 35 U.S.C. § 103, on the various claim/ground combinations listed below:

Claims	Basis	References
2	§ 103	Nakagawa and Chang
3, 6, 7	§ 103	Nakagawa and Stanifer
4	§ 103	Nakagawa and Beaverton
5, 8	§ 103	Nakagawa and Scapinakis
9	§ 103	Nakagawa and Hunt
10, 11, 13-15	§ 103	Nakagawa and Lowrey
12	§ 103	Nakagawa, Lowrey, and Qualcomm MSM6500
16-18	§ 103	Nakagawa and Bouchard

D. Priority Date of the '358 Patent

Progressive asserts that claims 1, 9, 19, and 20 of the '358 patent are entitled to an effective filing date of May 15, 2000. For reasons discussed below, we determine that Progressive has shown that claims 1, 19, and 20 are entitled to an effective filing date of May 15, 2000, but has not shown that claim 9 is entitled an effective filing date of May 15, 2000.

For an application to be entitled to the earlier filing date of an ancestral application, under 35 U.S.C. § 120, one of the requirements is that the earlier-filed application contain a disclosure that complies with 35 U.S.C. § 112, first paragraph, for the claims in the later-filed application. *Studiengesellschaft Kohle, m.b.H. v. Shell Oil Co.*, 112 F.3d 1561, 1564 (Fed. Cir. 1997); *Transco Prod. Inc. v. Performance Contracting Inc.*, 38 F.3d 551, 556 (Fed. Cir. 1994). For instance, if a continuation-in-part

application has a claim reciting a feature not described in the earlier-filed application, then that claim is entitled only to the later filing date of the continuation-in-part application. *In re Van Lagenhoven*, 458 F.2d 132, 136 (CCPA 1972).

Also, where there is a chain of continuing applications, if any application in the chain fails to make the requisite disclosure of the claimed subject matter under 35 U.S.C. § 112, first paragraph, then the claim is not entitled to the benefit of the filing date of the applications preceding the break in disclosure. *Hollmer v. Harari*, 681 F.3d 1351, 1355 (Fed. Cir. 2012). For a claim to gain the benefit of the filing date of an earlier filed application under 35 U.S.C. § 120, each application in the chain leading back to that earlier application must comply with the written description requirement of 35 U.S.C. § 112, first paragraph. *Zenon Envtl., Inc. v. U.S. Filter Corp.*, 506 F.3d 1370, 1378 (Fed. Cir. 2007); *Lockwood v. Am. Airlines, Inc*., 107 F.3d 1565, 1571 (Fed. Cir. 1997); *In re Hogan*, 559 F.2d 595, 609 (CCPA 1977); *In re Schneider*, 481 F.2d 1350, 1356 (CCPA 1973).

The ’358 patent issued from an application which is a continuation-in-part of Application 10/764,076 (“the ’076 application”), filed January 23, 2004, which is a continuation-in-part of application 09/571,650 (“the ’650 application”), filed May 15, 2000. In its Preliminary Response, Progressive asserted that its claims 1, 9, 19, and 20 are entitled to the earlier filing date of the ’650 application, and attempted to make an adequate showing in that regard. Prelim. Resp. 23-31, 34-38. The Board evaluated the showings in Progressive’s Preliminary Response and, in the Decision on Institution,

identified five features the description of which was not accounted sufficiently by Progressive in the ancestral applications. Dec. 19-21. Two features are from claim 1, and the remaining three are from claims 9, 19, and 20, respectively.

The test for determining satisfaction of the written description requirement of 35 U.S.C. § 112, first paragraph, is whether the application reasonably would have conveyed to one with ordinary skill in the art that the inventor possessed the claimed invention at the time of the original disclosure of the application. *Pandrol USA, LP v. Airboss Ry. Products, Inc.*, 424 F.3d 1161, 1165 (Fed. Cir. 2005). The specification must convey with reasonable clarity to those skilled in the art that as of the filing date of the application the inventor was in possession of the claimed invention. *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991).

The following discussion is based on the arguments and showings presented in Progressive's patent owner response and Liberty's reply. We discuss the five above-noted features, with regard to the disclosure of both the '650 application and the '076 application.

1.

Claim 1 recites a wireless transmitter configured "to transfer the selected vehicle data retained within the memory to a distributed network and a server." The recited functionality of the configured transmitter is specific. According to the claim, it must be that data retained within the memory which is transferred, not data which will be retained in memory, and not data which is being written into memory. Essentially, the

functionality required is that selected vehicle data is read from memory, and then the data, thus read, is transferred by the wireless transmitter. That also is the interpretation of the claim feature as it was read onto the disclosure of Nakagawa.

Progressive refers to Figure 4 of the '650 application, which is reproduced below:

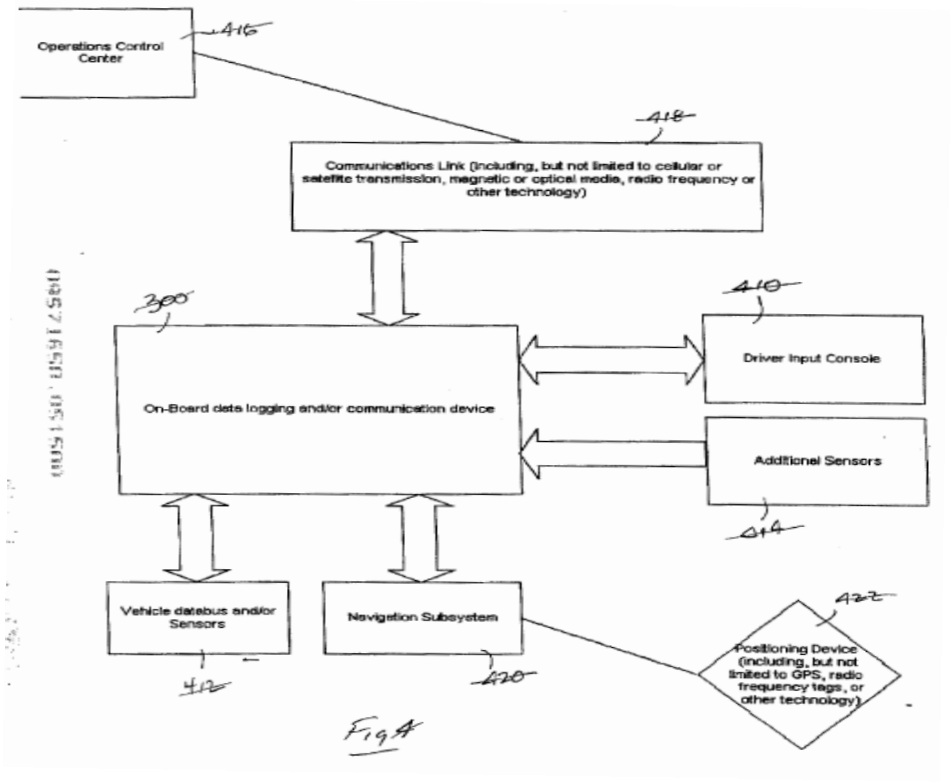


Figure 4 is a block diagram of a vehicle onboard computer and recording system which communicates with a remote operations control center. Ex. 2004, 9:13-15. As explained by Progressive (PO Resp. 35:1-2), device 300 in Figure 4 interfaces with vehicle data bus and/or sensors 412. That is true, as depicted. Progressive asserts, however, that Figure 4

"depicts device 300 receiving data from vehicle database and/or sensors 412 in order to provide the sensor data information to the operations control center 416 through communication link 418." PO Resp. 35:2-4. That assertion, in light of other disclosures cited by Progressive, is persuasive that stored vehicle data from a memory is read to provide selected vehicle data to the transmitter, which according to Figure 4 of the '650 application can be a wireless transmitter, for sending to remote operations control center 416.

While box 412 in Figure 4 is labeled "Vehicle databus and/or Sensors," that disclosure by itself is general and means no more than that a communication path exists to both the vehicle databus and sensors. It does not mean, necessarily, that when box 412 provides information to device 300 for sending to remote operations control center 416, the information is read from a memory that is connected to the vehicle databus.

However, Progressive cites to other disclosure in the '650 application, which must be read in conjunction with the illustration in Figure 4. Progressive cites (PO Resp. 35:5-7) to this descriptive text in the '650 application: "An on-board computer 300 monitors and records various sensors and operator actions to acquire the desired data for determining a fair cost of insurance." Ex. 2004, 11:9-11. That description indicates that sensed vehicle data is stored in an onboard memory, as a part of the operations for determining a fair cost of insurance. In that regard, the '650 application describes the insurer, remote from the vehicle, as the entity generating, on the basis of all the acquired data, a cost of insurance. Ex. 2004, 19:20-20:6. Progressive also cites (PO Resp. 38:2-4) to this

descriptive text in the '650 application: "The unit of risk 200 is primarily concerned with transferring three classes of data between it and the insurer. The event data **500** and stored sensor data **502** have been discussed with reference to FIG. 1." Ex. 2004, 19:8-10. That description of data transferred between the vehicle and the insurer as "stored sensor data" indicates that the data sent to the insurer from the vehicle is, indeed, read from a memory.

We have considered ¶¶ 75-82 of the declaration testimony of Mr. Zatkovich (Ex. 2007), which cites to the same portions of the '650 application discussed above, as well as Figure 5 of the '650 application. The testimony supports the position taken by Progressive, as discussed above. We also have considered the declaration testimony of Mr. Andrews, in his rebuttal declaration, which accompanied Liberty's reply, specifically ¶¶ 49-50 of that declaration. Ex. 1034. We are not persuaded by the testimony of Mr. Andrews, because it does not address sufficiently the various portions of the disclosure of the '650 application relied on by Progressive, as we have discussed above.

For example, Mr. Andrews states that Mr. Zatkovich provides no support to show that the referenced "stored sensor data" in the '650 application is the "selected vehicle data" required by claim 1. Ex. 1034 ¶ 50. But Mr. Zatkovich does cite (Ex. 2007 ¶ 75) to this significant disclosure of the '650 application: "An on-board computer 300 monitors and records various sensors and operator actions to acquire the desired data for determining a fair cost of insurance." Ex. 2004, 11:9-11.

Mr. Andrews refers to Figure 1 of the '650 application as not disclosing the sending of recorded vehicle data to a distributed network and a server. Ex. 1034 ¶ 50. But Figure 1 is a general flowchart only of the "data capture process" performed "within the vehicle." Ex. 2004, 14:27-29. It does not purport to describe what happens after action performed by the last action box in Figure 1, box 110, labeled as "Record Data." What Figure 1 discloses about trigger event processing that occurs prior to box 110, as explained by Mr. Andrews, is consistent with the testimony of Mr. Zatkovich.

We also credit Mr. Zatkovich's testimony over that of Mr. Andrews, on whether the wireless transmission in the disclosure of the '650 application is to a "distributed network and a server." Mr. Zatkovich identifies (Ex. 2007 ¶ 77) wireless communications link 418, disclosed in the '650 application as a cellular telephone, radio, or satellite system, as the wireless transmitter, and explains (Ex. 2007 ¶ 81) that a cellular telephone system is an example of a distributed network.

For the foregoing reasons, we determine that Progressive has shown that there is written description in the '650 application to support the recitation in claim 1 of "a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network and a server."

With regard to the disclosure of the '076 application, Progressive explains, persuasively, that concerning the feature of "a wireless transmitter configured to transfer the selected vehicle data retained within the memory

to a distributed network and a server," the disclosure of the '076 application "is nearly identical" to the relevant portions of the disclosure of the '650 application. PO Resp. 57-58. With regard to this feature, Liberty does not identify any pertinent, substantive difference between the two disclosures, and does not make arguments apart from those discussed and rejected above in the context of the '650 application. Accordingly, we determine that Progressive has shown that there is written description in the '076 application to support the recitation in claim 1 of "a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network and a server."

2.

Claim 1 recites a server as the recipient of the wireless transmission of selected vehicle data, and further requires (a) a database operatively linked to the server to store the selected vehicle data transmitted by the wireless transmitter, (b) where the server is configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects a premium of an insurance policy, safety or level of risk, and (c) where the server is further configured to generate a rating factor based on the selected vehicle data stored in the database.

In pages 38-49 of its patent owner response, Progressive provides detailed explanations, with citations to the record and to the supporting testimony of Mr. Zatkovich and Mr. Miller, of why there is written description in the disclosure of the '650 application for each of the above-

noted features concerning a server. With the exception of Progressive's contention on page 49 of the patent owner response that an actual calculated amount of premium surcharge or discount constitutes a rating factor, Progressive's arguments are persuasive. An actual premium or surcharge is not a "rating factor" as we have construed the term. A "rating factor" reflects an associated level of risk and, therefore, a general level of premium, but is not itself an amount of insurance premium, surcharge, or discount. It is at least one step removed from an actual amount of insurance premium, surcharge, or discount. Herein below, we focus on the arguments of Liberty as presented in its reply, which are unpersuasive.

Fewer Figures and Columns

Liberty notes that the '358 patent disclosure, as compared to the disclosure of the '650 application, contains nineteen more figures and twenty-six more columns of text. Reply 14. However, that, in itself, does not establish the specific material that was added. The additional material may be drawn to the subject matter of claims 2-8 and 10-18, with respect to which Progressive does not contend that it is entitled to the earlier filing date of the '650 application.

Generating a Rating Factor

Liberty correctly notes that claim 1 requires the generation by the server of a "rating factor," which is not yet the insurance premium. Reply 10. As explained above, however, the Board's construction of "rating factor" is the broadest reasonable construction. It is "a calculated insurance

risk value such as a safety score or a usage discount," with the clarification that "an insurance risk value would be a value that reflects an associated level of insurance risk and, therefore, also a corresponding insurance premium."

Liberty argues that the disclosure of the '650 application only refers to insurance premium determination generally, and nowhere refers to the calculation of a "rating factor." Reply 10. That argument is unpersuasive. Satisfaction of the written description requirement under 35 U.S.C. § 112, first paragraph, does not require the description to be literally the same as the claim language at issue. *In re Wertheim*, 541 F.2d 257, 265 (CCPA 1976); *In re Lukach*, 442 F.2d 967, 969 (CCPA 1971). Rather, by whatever language, the specification only must convey with reasonable clarity to those skilled in the art that, as of the filing date of the application, the inventor was in possession of the claimed invention. *Vas-Cath Inc.*, 935 F.2d at 1563-64.

Progressive identifies (PO Resp. 48) the following disclosure in the '650 application: "The subject invention will base insurance charges with regard to current material data representative of actual operating characteristics to provide a classification rating of an operator or the unit in an actuarial class which has vastly reduced rating error over conventional insurance cost systems." Ex. 2004, 6:15-18. That cited disclosure is significant, as it reasonably conveys that the inventors were in possession of basing the calculation of insurance charges on the rating of an operator in an actuarial class. The general disclosure of calculating an insurance premium is augmented by this disclosure that the calculation of insurance charges will

be based on the placement of an operator into an actuarial class with a corresponding rating.

Progressive further identifies (PO Resp. 48, n.3) the following disclosure in the '650 application: "It is another object of the present invention to generate actuarial classes and operator profiles relative thereto based upon actual driving characteristics of the vehicle and driver, as represented by the monitored and recorded data elements for providing a more knowledgeable, enhanced insurance rating precision." Ex. 2004, 8:12-15. That cited disclosure also is significant, because it also reasonably conveys that the inventors were in possession of basing the calculation of insurance charges on the rating of an operator in an actuarial class.

Citing the declaration testimony of Mr. Michael J. Miller (Ex. 2005 ¶ 39), Progressive explains that an actuarial class inherently has associated with it a rate factor and a risk factor. PO Resp. 48. Also citing the declaration testimony of Mr. Miller (Ex. 2005 ¶ 39), Progressive explains that use of an actuarial class within the context of insurance necessarily involves generating and using a rating factor. PO Resp. 48. These contentions are supported by the cited testimony of Mr. Miller. Additionally, Mr. Miller refers to the above-noted portions of the disclosure of the '650 application, and concludes that the '650 application inherently discloses the generation of rating factors. Ex. 2005 ¶ 42. The testimony is persuasive, because the cited portions of the disclosure of the '650 application reasonably convey that insurance cost would be determined by placing an insured in a corresponding actuarial class.

Liberty argues that the disclosure of the '650 application nowhere explains how to calculate actuarial classes. Reply 11. However, it is well established that a specification need not disclose what is well known in the art. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385 (Fed. Cir. 1986); *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1463 (Fed. Cir. 1984).

Liberty contends that insurance costs may be determined based on detected driving characteristics without necessarily generating a rating factor prior to such determination. Reply 11. That contention is supported by the declaration testimony of Ms. Mary L. O'Neil. Ex. 1032 ¶¶ 22, 24. However, both Liberty's contention and the cited testimony of Ms. O'Neil are not on point. The pertinent issue that should be addressed by Liberty is not the general one—whether insurance costs may be determined based on detected driving characteristics without necessarily generating a rating factor prior to such determination. Instead, it is the more specific one—whether insurance costs determined by placing operators into actuarial classes necessarily involve the generation of a rating factor. Accordingly, the testimony in ¶¶ 22 and 24 of Ms. O'Neil's declaration is inapposite, and Liberty's assertion is not persuasive.

Paragraph 23 of the declaration of Ms. O'Neil (Ex. 1032) is more apposite but still unpersuasive. It is reproduced below:

> 23. In the absence of specific mention of the calculation of rating factors, a POSITA could conclude that direct calculation of insurance costs was intended by the '650 patent application. For example, the '650 application discloses

> types of roads driven as an example of monitored vehicle data. If type of roads driven was utilized to identify two appropriate actuarial classes, high risk and low risk, it would not be necessary to generate rating factors in order to determine the cost of insurance for each group. Instead each group could be analyzed separately and an appropriate insurance cost could be derived directly using standard actuarial ratemaking procedures, *e.g.*, using each group's premium experience, claim loss experience, and expense experience. The same concept would apply to each of the examples of monitored data provided. Hence, there would be no requirement to generate a rating factor.

At the outset, it is noted that the portion of Liberty's reply (Reply 11) citing to ¶¶ 20-25 of the declaration of Ms. O'Neil does not make the argument that determining insurance costs based on actuarial class does not require the generation of rating factors. Rather, it simply states that insurance costs may be determined based on detected driving characteristics without necessarily generating a rating factor prior to the determination. Thus, the specific contention in the above-quoted testimony regarding determining insurance cost based on actuarial classes was not made by Liberty and need not be addressed. Even considering the argument, however, for reasons discussed below, we find the above-quoted testimony unpersuasive.

The argument essentially is that one could determine a representative claim loss experience for the group in an actuarial class, or a representative expense experience for the group in an actuarial class, and then use those values to determine the insurance cost for the operator, as though the values

are the operator's own values. However, we have construed "rating factor" as a "calculated insurance risk value such as a safety score or a usage discount," and further clarified that "an insurance risk value would be a value that reflects an associated level of insurance risk and, therefore, also a corresponding insurance premium." Given that meaning of "rating factor," which essentially is what Liberty proposed in its petition, the representative and determined group experience in each actuarial class is itself a "rating factor." Therefore, even in the scenario described in ¶ 23 of the declaration of Ms. O'Neil, rating factors still are generated for calculating the insurance premium for an operator.

Remote Server Generating a Rating Factor

Liberty argues that, even assuming that a rating factor is generated, the '650 application does not necessarily disclose that it is generated at a remote server, as is required by claim 1. Reply 11. The argument and the supporting testimony of Mr. Andrews (Ex. 1034, ¶¶ 40-43, 45-48) are unpersuasive, for reasons discussed below.

According to Liberty, the '650 application discloses that "charges/billing" algorithm "530," "rating algorithms 522," and "processing logic" are developed by the insurer, but actually communicated to, and located on, the on-board computer of each vehicle. Reply 11. In support of that contention, Mr. Andrews cites (Ex. 1034 ¶ 47) to the following statement in the '650 application:

> An insurer can over time use the accumulated underwriting and rating information from individual customers **520** to develop improved rating algorithms **522**. Such improved algorithms can be regularly communicated to the units of risk **200** for improved insurance cost computation accuracies. The improved rating algorithms can be communicated **524** to the units of risk on-board device **300** (FIG. 4).

Ex. 2004, 20:30-21:3. Mr. Andrews also cites (Ex. 1034 ¶ 47) to the part of the disclosure of the '650 application which indicates that certain specialized data processing logic, necessary for acquiring specialized data from the vehicle, can be transferred from the insurer to the unit of risk. Ex. 2004, 19:10-13.

We find Liberty's argument and the supporting testimony of Mr. Andrews to be unpersuasive because they narrowly focus on a small part of the disclosure of the '650 application, to the exclusion of all other parts identified and discussed by Progressive and its expert witness. Based on Liberty's narrow focus, the cited portions of the disclosure of the '650 application supplements the disclosures relied on by Progressive, rather than contradict them. Nothing precludes the individual units of risk, i.e., the vehicles, from also possessing the rating algorithms. Progressive has presented persuasive evidence that insurance cost computation occurs at the insurer, whether or not the rating algorithm also is communicated to individual units of risk. For instance, Figure 5 of the '650 application is reproduced below:

Case CBM2012-00003
Patent 8,140,358

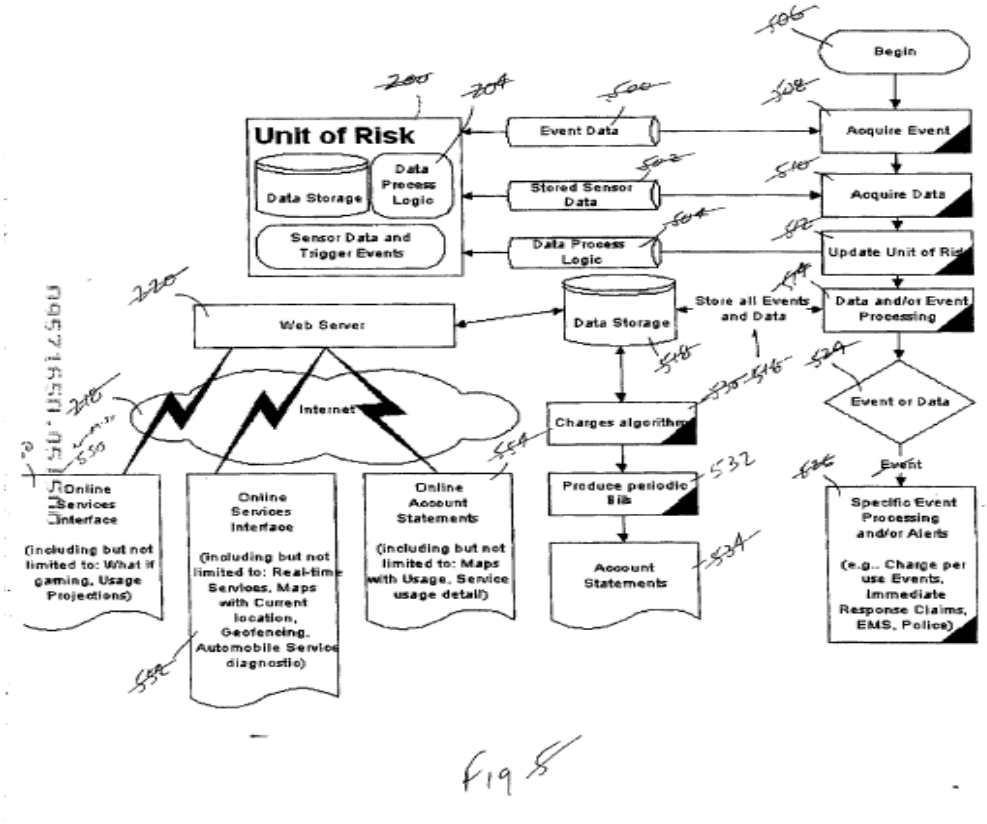


Fig 5

Figure 5 is a block diagram illustrating the operations performed on acquired vehicle data, wherein unit of risk 200 designates an individual vehicle. Ex. 2004, 9:16-17, 19:6-7. In connection with the operations illustrated in Figure 5, the '650 application describes that the insurer receives sensor data 510, processes the raw data, and stores all relevant data in storage device 518. Ex. 2004, 19:20-24. The '650 application also describes, while discussing operations at the insurer, that billing algorithm 530, shown in Figure 4 as located at the insurer, accesses the data stored in storage device 518 to generate an insurance cost for the unit of risk. Ex. 2004, 19:30-20:6. None of that is contradicted also by sending the rating algorithm and specialized processing logic to the vehicle.

We do not see Progressive as arguing that insurance premium calculation inherently occurs at the insurer. Rather, it simply takes the position that the '650 application directly discloses insurance premium calculation at the insurer. In that regard, Liberty points to three locations in Progressive's patent owner response where inherency is argued. Reply 12 (citing PO Resp. 39, 43, 48). But those arguments concern whether there is a server at the insurer, whether the insurer's storage unit provides a searching function, and whether calculating insurance cost by use of actuarial classes necessarily involves generation of a rating factor, not whether insurance cost computation necessarily and inherently must be performed at the insurer.

We also are not persuaded by Mr. Andrews' testimony (Ex. 1034 ¶ 46) that the '650 application does not disclose that it is a "server" at the insurer, which performs the calculation of insurance cost. According to Mr. Andrews, a "server" is a processor, but a processor is not necessarily a server. Ex. 1034 ¶ 46. Mr. Andrews cites to this dictionary definition of "server" (Ex. 1036, 430): "a computer or program that responds to commands from a client." Ex. 1034 ¶ 46 (internal quotation marks omitted). Mr. Andrews testifies: "Nowhere is there any description [in the '650 application] that any charging and billing processes are requested by a client device and are then served by a server." *Id.* The contention is unpersuasive for two reasons.

First, Mr. Andrews does not explain why a command must be explicit, literal, or specific, and why it is not an implicit command to a computer

simply to send it information, which is expected to trigger a series of predetermined actions. The rule of broadest reasonable interpretation applies in the construction of a "server." Liberty does not explain why the data transfer from the on-board computer to the insurer does not constitute an implicit command for a computer at the insurer to take predetermined actions based on that transferred data. Also, in that connection, a computer need not be comprised of only a single processor. Liberty does not explain why multiple processors in one system may not be regarded as a computer.

Second, even assuming that a server must respond to an explicit, literal, and specific command from a client, claim 1 does not require that that command be, specifically, an instruction to generate a rating factor or to calculate an insurance premium. The command can be for any other action, such as for a client to have access to stored information associated with the client. The '650 application describes: "Another important feature of the subject invention illustrated in FIG. 5 is that the insurer provides a Webserver **220** to allow a customer to access via Internet **218** communication, the relevant sensor data and event data associated with the customer." Ex. 2004, 20:7-9. Therefore, in any event, the customer does send a command to the insurer, which then responds to the command. In that regard, Progressive and its expert witness Mr. Zatkovich identify unit 208 in Figure 2 of the '650 application as the "server." PO Resp. 39:1-8; Ex. 2007 ¶ 84. Unit 208 performs the rating, billing, and processing functions of the insurer. Ex. 2007 ¶ 84. It also includes web server 220,

which responds to user request to access stored information. *Id*. On that basis, unit 208 qualifies as a "server."

For the foregoing reasons, we determine that Progressive has shown that there is written description in the disclosure of the '650 application to support the various limitations in claim 1 regarding the server and its functionalities.

With regard to the claim features concerning server, as discussed above in connection with the disclosure of the '650 application, Progressive explains, persuasively, that the disclosure of the '076 application "contains substantially similar disclosure" as that of the '650 application. PO Resp. 58-61. With regard to the evidence relied on by Progressive, Liberty does not identify any disclosure that is contained in the '650 application disclosure, but not the '076 application disclosure. Furthermore, with regard to the generation of a rating factor, Progressive identifies (PO Resp. 60-61) additional disclosure in the '076 application, including the following:

> In the exemplary embodiment, the discount section 818 of the operational summary 814 indicates that a total discount 852 is based upon a calculation including an upload bonus 854, a rating factor, such as a safety score 856 and a usage discount 858.

Ex. 2012, 32:23-25. Liberty does not refute specifically the additional disclosures from the '076 application, as cited by Progressive. Instead, Liberty's arguments pertaining to the '076 application are essentially the same as those discussed and rejected above in the context of the discussion of the disclosure of the '650 application.

Accordingly, we determine that Progressive has shown that there is written description in the '076 application to support the various server features required by claim 1.

3.

Claim 9 depends on claim 1 and recites "where the processor, the memory, and the wireless transmitter are in communication within a portable device." Progressive identifies onboard computer 300 shown in Figure 3 of the '650 application as the portable device including the processor, the memory, and the wireless transmitter. PO Resp. 50. Citing the testimony of Mr. Zatkovich (Ex. 2007 ¶ 109), Progressive argues that onboard computer 300 is portable because (1) it is relatively small in size, as shown in Figure 3, comparable to the size of a gas tank cover, and (2) the '650 application discloses that it employs plug-and-play type of connectors to connect to other components. PO Resp. 50. The arguments are unpersuasive.

Patent drawings do not define the precise proportions of elements and may not be relied on to show particular sizes if the specification is silent on the issue. *Hockerson-Halberstadt Inc. v. Avia Group, Int'l, Inc*., 222 F.3d 951, 956 (Fed. Cir. 2000). The disclosure of the '650 application is otherwise silent on the issue of the size of unit 300. Also, small size of a unit facilitates the unit's portability, but does not require it. Progressive does not discuss the benefits of small size to units which are not portable, and does not represent that there is none. The same is true with respect to the argument that onboard computer 300 uses plug-and-play type of connectors. Using plug-and-play type of connectors facilitates the unit's

portability, but does not require it. Progressive does not discuss the benefits of plug-and-play connectors in units which are not portable, and does not represent that there is none.

Progressive further notes that in Figure 4 of the '650 application, onboard computer is labeled as "on-board data logging and/or communication device." PO Resp. 50 (emphasis and internal quotation marks omitted). Citing the testimony of Mr. Zatkovich (Ex. 2007 ¶ 110), Progressive asserts that the name discloses that the chipset for the wireless transmitter is present within onboard computer 300. PO Resp. 50-51. The argument, as well as the supporting testimony of Mr. Zatkovich, is not persuasive for two reasons. First, the disclosure of the '650 application itself states: "The communications link to a central control station is accomplished through the cellular telephone, radio, satellite or other wireless communication system 314." Ex. 2004, 11:20-22. As shown in Fig. 3 of the '650 application, device 314 is external to onboard computer 300. Second, the "communication" part of the name for unit 300, as shown in Fig. 4, likely refers to communication with other onboard devices, and not with the remote central control station. In that regard, note that the disclosure of the '650 application states: "The computer **300** essentially communicates with a number of on-board vehicle devices for acquisition of information representative of various actual vehicle operating characteristics." Ex. 2004, 11:28-30.

Accordingly, we determine that Progressive has not shown that there is written description in the '650 application to support the feature recited in

claim 9 requiring a portable device containing the processor, the memory, and the wireless transmitter.

With regard to the claim feature concerning portability of a device containing the processor, the memory, and the wireless transmitter, Progressive asserts, persuasively, that the disclosure of the '076 application "contains substantially similar disclosure" as that of the '650 application. PO Resp. 61. Progressive relies on the same arguments it asserted in the context of the disclosure of the '650 application, which we have determined to be unpersuasive. Accordingly, we determine that Progressive has not shown that there is written description in the '076 application to support the feature recited in claim 9 requiring a portable device containing the processor, the memory, and the wireless transmitter.

4.

Claim 19 depends on claim 1 and further recites "where the server is further configured to calculate an insured's premium under the insured's insurance policy based on the rating factor, or a surcharge or a discount to the insured's premium, based on the rating factor." Progressive provides detailed explanations, with citations to the record and to the supporting testimony of Mr. Zatkovich and Mr. Miller, of why there is written description in the disclosures of the '650 application and the '076 application to support the above-quoted recitation of claim 19. PO Resp. 51-52, 61-62. Progressive's arguments are persuasive, and Liberty presents no argument beyond those already discussed above in the discussion of claim 1. Accordingly, we determine that Progressive has shown that there is written

description in the '650 application and the '076 application to support the above-quoted recitation of claim 19.

5.

Claim 20 depends on claim 1 and further recites "where the server is further configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects an insured's premium under an insured's insurance policy." In pages 52-53 and 62-63 of its patent owner response, Progressive provides detailed explanations, with citations to the record and to the supporting testimony of Mr. Zatkovich and Mr. Miller, of why there is written description in the disclosures of the '650 application and the '076 application to support the above-quoted recitation of claim 20. Progressive's arguments are persuasive, and Liberty presents no argument beyond those already discussed above in the discussion of claim 1. Accordingly, we determine that Progressive has shown that there is written description in the '650 application and the '076 application to support the above-quoted recitation of claim 20.

E. Liberty's Motion to Exclude Evidence

Liberty seeks to exclude certain declaration testimony of Progressive's expert witnesses Ivan Zatkovich (Ex. 2007 ¶¶ 10-149) and Michael J. Miller (Ex. 2005 ¶ 15 and Ex. 2013 ¶¶ 2-5). Paper 55 ("Pet. Mot.") at 4. As the movant, Liberty has the burden of proof to establish that it is entitled to the requested relief. 37 C.F.R. § 42.20(c).

Citing to Rule 702 of the Federal Rules of Evidence ("Fed. R. Evid."), Liberty argues that Mr. Zatkovich lacks the necessary scientific, technical, or other specialized knowledge on *insurance and telematics* issues pertinent to the '358 Patent to provide testimony on those subjects." Pet. Mot. 5.

Liberty also argues that, even as to the subject of *telematics* only, Mr. Zatkovich's qualifying experience must have been acquired as of the date of invention of the '358 Patent, e.g., the January 1996 filing date of the earliest ancestral patent application in the chain of applications leading back from the '358 patent. Pet. Mot. 6.

We disagree that Mr. Zatkovich must be qualified both in the field of insurance and in the field of vehicle telematics to give useful testimony in this proceeding. It is only the "hypothetical" person of ordinary skill in the art who possesses ordinary skill in each of the fields involved in a claimed invention. The qualifications of Mr. Zatkovich, as summarized in his curriculum vitae (Ex. 2008), qualifies him to give expert testimony on the subject of vehicle telematics, computer systems, and network communications. With regard to Mr. Zatkovich's alleged lack of ordinary skill on the specific subject of insurance, the Board weighs his testimony accordingly, taking into account the limited extent of his expertise.

We also disagree that Mr. Zatkovich's technical experience must have been acquired prior to January 1996. Liberty cites no authority supporting its position in that regard.

Liberty seeks to exclude ¶ 15 of Mr. Miller's declaration (Ex. 2005) and ¶¶ 2-5 of Mr. Miller's supplemental declaration (Ex. 2013). Pet. Mot. 6-

7. The basis of Liberty's underlying objection is that, although Mr. Miller in ¶ 15 of his declaration (Ex. 2005) referred to a publication titled "Risk Classification Statement of Principles," published by the American Academy of Actuaries in 1980, with which his testimony is allegedly consistent, Progressive did not provide timely a copy of the publication to Liberty. Instead, in response to Liberty's objection, Progressive filed a supplemental declaration of Mr. Miller (Ex. 2013), which in ¶¶ 2-5 indicates (1) that Mr. Miller was a member of the American Academy of Actuaries from 1975 to 2010, (2) that Exhibit 2012 in CBM2012-00002 is a true and correct copy of a publication titled "Risk Classification Statement of Principles," published by the American Academy of Actuaries in 1980, (3) that Exhibit 2012 in CBM2012-00002 is widely accepted and followed by members of the actuarial profession, and (4) that Exhibit 2012 in CBM2012-00002 is the same publication referred to in ¶ 15 of Mr. Miller's declaration (Ex. 2005).

Progressive ultimately filed a copy of the publication at issue, as Exhibit 2018, together with its opposition to Liberty's motion to exclude evidence. Progressive should have served a copy of the publication at the time it filed the patent owner response, or at the time it filed the supplemental declaration of Mr. Miller, and not waited until the time of its opposition to Liberty's motion to exclude evidence. Under 37 C.F.R. § 41.51(b)(1)(i), "[u]nless previously served or otherwise by agreement of the parties, any exhibit cited in a paper or in testimony must be served with the citing paper or testimony." The wording "previously served" in

37 C.F.R. § 41.51(b)(1)(i) is construed to mean within the same proceeding before the Board, and does not cover related proceedings.

Liberty does not dispute that prior to the filing of the patent owner response, Progressive had served Liberty, in related proceeding CBM2012-00002, a copy of Exhibit 2012 in CBM2012-00002. Liberty also does not dispute that Exhibit 2012 in CBM2012-00002 is the publication referenced in ¶ 15 of Mr. Miller's declaration (Ex. 2005). Given that Progressive, through the supplemental declaration of Mr. Miller, informed Liberty that the publication at issue is the same as Exhibit 2012 in CBM2012-00002, there is no prejudice to Liberty for not having been served, at the time of Progressive's patent owner response, with the publication. Under the totality of these circumstances, and given that there is no pattern of repeated violations of 37 C.F.R. § 41.51(b)(1)(i) by Progressive, we decline to exclude the testimony of Mr. Miller.

Liberty's Motion to Exclude Evidence is *denied*.

F. Progressive's Motion to Exclude Evidence

Progressive seeks to exclude the reply declarations of Liberty's expert witnesses, i.e., Exhibit 1032, the reply declaration of Mary L. O'Neil, and Exhibit 1034, the reply declaration of Scott Andrews. Paper 58 ("PO Mot.").

For reasons discussed below, the motion is *denied*.

Progressive asserts that the reply declarations of Ms. O'Neil and Mr. Andrews are improper because they cite to evidence not relied on originally in Liberty's petition. According to Progressive, if Liberty wanted

to rely on such evidence, it should have done so in its petition, and not waited until the time of filing of Liberty's reply. In that regard, Progressive cites to 37 C.F.R. §§ 42.304(b)(4) and 42.304(b)(5), and asserts that a petition to institute a covered business method patent review must be accompanied by all of the evidence upon which the Petitioner relies in challenging patentability. PO Mot. 2:3-5.

The mere fact that the reply declarations cite to evidence not specifically referred to or discussed in Liberty's petition is insufficient to establish impropriety of such evidence, much less inadmissibility under the Federal Rules of Evidence. The very nature of a reply is to respond to the opposition, which in this case is the patent owner response. *See* 37 C.F.R. § 42.23(b). The need for relying on evidence not previously discussed in the petition may not have existed until a certain point has been raised in the patent owner response. Much depends on the specific arguments made in the patent owner response.

For instance, if the patent owner response simply states that the petition is lacking because it fails to address a certain claim limitation, then it would be too late to address that limitation, for the first time, in the reply. On the other hand, if the Patent Owner Response makes an argument that reasonably could not have been anticipated by Petitioner, the Petitioner properly may, as a part of its reply, rely on new evidence or cite to different portions of the same prior art reference.

As the movant, Progressive has the burden of proof to establish that it is entitled to the requested relief. 37 C.F.R. § 42.20(c). Here, notably,

Progressive's motion does not contain any meaningful discussion of the arguments Progressive has made in its patent owner response, which reasonably might or might not have triggered Liberty's reliance on the testimony Progressive now seeks to exclude. Without such an analysis, Progressive has not shown that the reply declarations of Mary L. O'Neil and Scott Andrews exceed the proper scope of reply evidence.

Progressive asserts that Liberty needs the evidence relied on in the reply to make out a prima facie case for the petition. PO Mot. 2-3. However, without meaningful explanation from Progressive, it is not apparent to us, and we do not determine that to be the case. In that regard, note that in the Decision on Institution, the Board determined that Liberty had shown that it was more likely than not that it would prevail in showing unpatentability of claims 1-20 of the '358 patent.

Furthermore, while Progressive's motion specifically discusses only selected paragraphs of the reply declarations of Ms. O'Neil and Mr. Andrews, it seeks to exclude the entirety of the reply declarations. PO Mot. 2-4. That, in itself, is sufficient basis to deny the relief requested. As the moving party, Progressive should ensure that the relief requested is commensurate in scope with its substantive analysis and supporting evidence.

Finally, Progressive cites to no authority applying the Federal Rules of Evidence to the situation of a motion to exclude reply evidence allegedly exceeding its proper scope. A motion to exclude evidence is not the vehicle intended for resolution of such an issue. Note, for instance, that a motion to

exclude evidence must identify where in the record an objection was originally made. Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,767 (Aug. 14, 2012). Progressive's motion to exclude does not identify where in the record an objection originally was made about the reply declarations allegedly exceeding their proper scope.

Progressive's Motion to Exclude Evidence *denied*.

III. CONCLUSION

Liberty has shown, by a preponderance of the evidence, that claims 2-18 of the '358 patent are unpatentable based on each of the ground of unpatentability on the basis of which this trial was instituted with respect to claims 2-18, as listed below:

Claims	Basis	References
2	§ 103	Nakagawa and Chang
3, 6, 7	§ 103	Nakagawa and Stanifer
4	§ 103	Nakagawa and Beaverton
5, 8	§ 103	Nakagawa and Scapinakis
9	§ 103	Nakagawa and Hunt
10, 11, 13-15	§ 103	Nakagawa and Lowrey
12	§ 103	Nakagawa, Lowrey, and Qualcomm MSM6500
16, 17, 18	§ 103	Nakagawa and Bouchard

IV. ORDER

In consideration of the foregoing, it is

ORDERED that claims 2-18 of the '358 patent are CANCELLED;

FURTHER ORDERED that Liberty's Motion to Exclude Evidence is *denied*; and

FURTHER ORDERED that Progressive's Motion to Exclude Evidence is *denied.*

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US008140358B1

(12) **United States Patent**
Ling et al.

(10) **Patent No.: US 8,140,358 B1**
(45) **Date of Patent: Mar. 20, 2012**

(54) **VEHICLE MONITORING SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 848 days.

(21) Appl. No.: **12/132,487**

(22) Filed: **Jun. 3, 2008**

Related U.S. Application Data

(63) Continuation-in-part of application No. 10/764,076, filed on Jan. 23, 2004, which is a continuation-in-part of application No. 09/571,650, filed on May 15, 2000, now Pat. No. 6,868,386, which is a continuation-in-part of application No. 09/135,034, filed on Aug. 17, 1998, now Pat. No. 6,064,970, which is a continuation of application No. 08/592,958, filed on Jan. 29, 1996, now Pat. No. 5,797,134.

(51) **Int. Cl.**
G06Q 40/00 (2012.01)

(52) **U.S. Cl.** **705/4**; 340/439; 702/188

(58) **Field of Classification Search** ..... None
See application file for complete search history.

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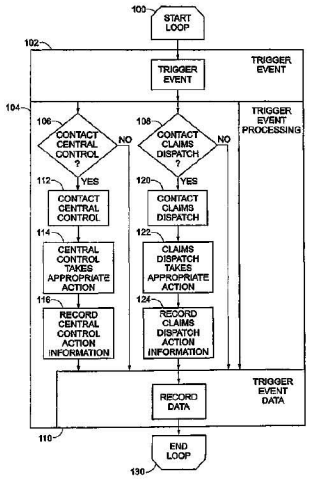
(57) **ABSTRACT**

A data logging device tracks the operation of a vehicle or driver actions. The device includes a storage device, which may be removable or portable, having a first memory portion that may be read from and may be written to in a vehicle and a second memory portion that may be read from and may be written to in the vehicle. The second memory portion may retain data attributes associated with the data stored in the first removable storage device. A processor reads data from an automotive bus that transfers data from vehicle sensors to other automotive components. The processor writes data to the first memory portion and the second memory portion that reflect a level of risk or safety. A communication device links the storage device to a network of computers. The communication device may be accessible through software that allows a user to access files related to a level of risk or safety and other software that may be related to those files.

20 Claims, 36 Drawing Sheets



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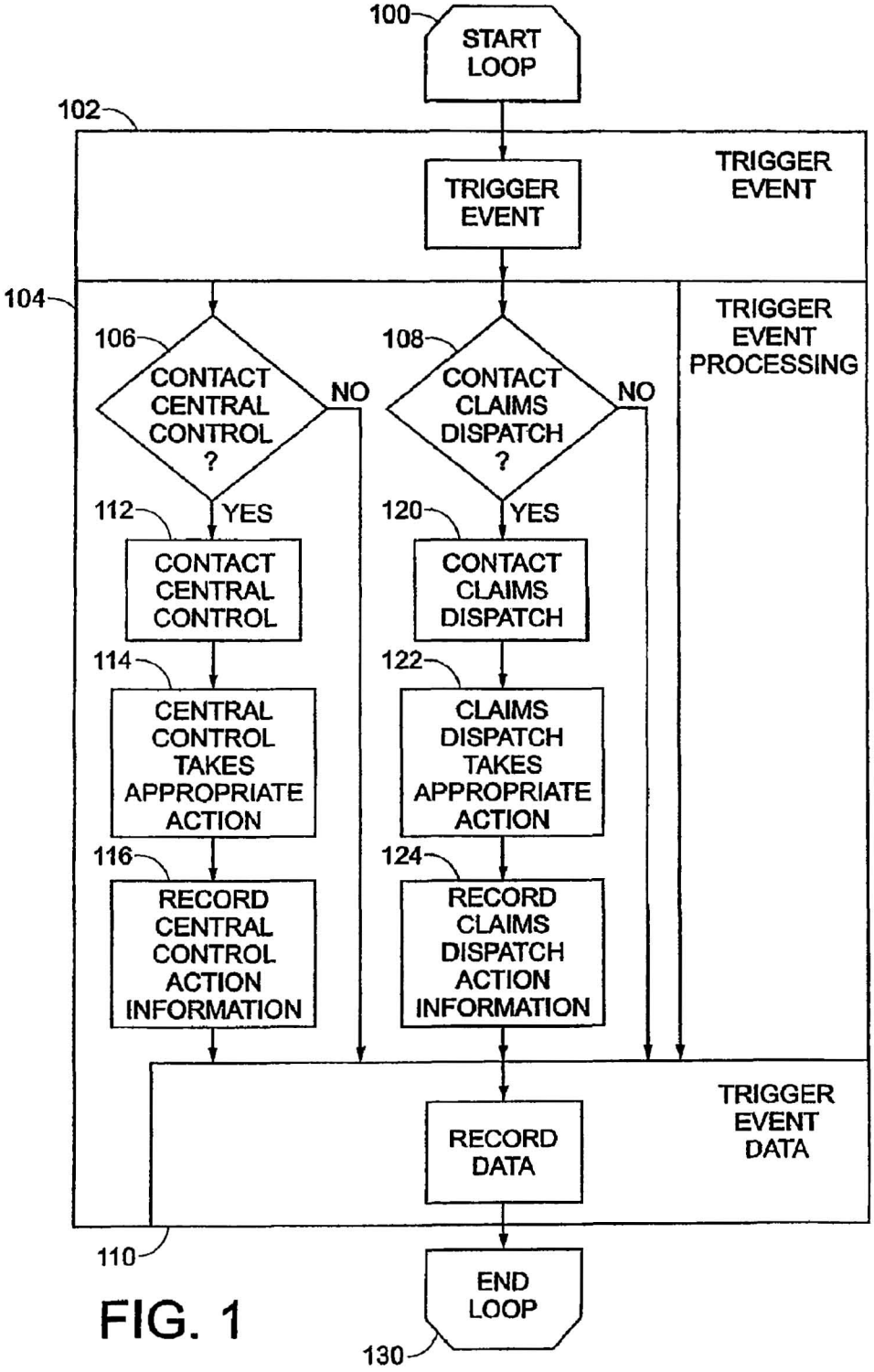
100
START LOOP
102
TRIGGER EVENT
TRIGGER EVENT
104
TRIGGER EVENT PROCESSING
106
CONTACT CENTRAL CONTROL ?
NO
YES
108
CONTACT CLAIMS DISPATCH ?
NO
YES
112
CONTACT CENTRAL CONTROL
114
CENTRAL CONTROL TAKES APPROPRIATE ACTION
116
RECORD CENTRAL CONTROL ACTION INFORMATION
120
CONTACT CLAIMS DISPATCH
122
CLAIMS DISPATCH TAKES APPROPRIATE ACTION
124
RECORD CLAIMS DISPATCH ACTION INFORMATION
RECORD DATA
TRIGGER EVENT DATA
110
END LOOP
130

FIG. 1

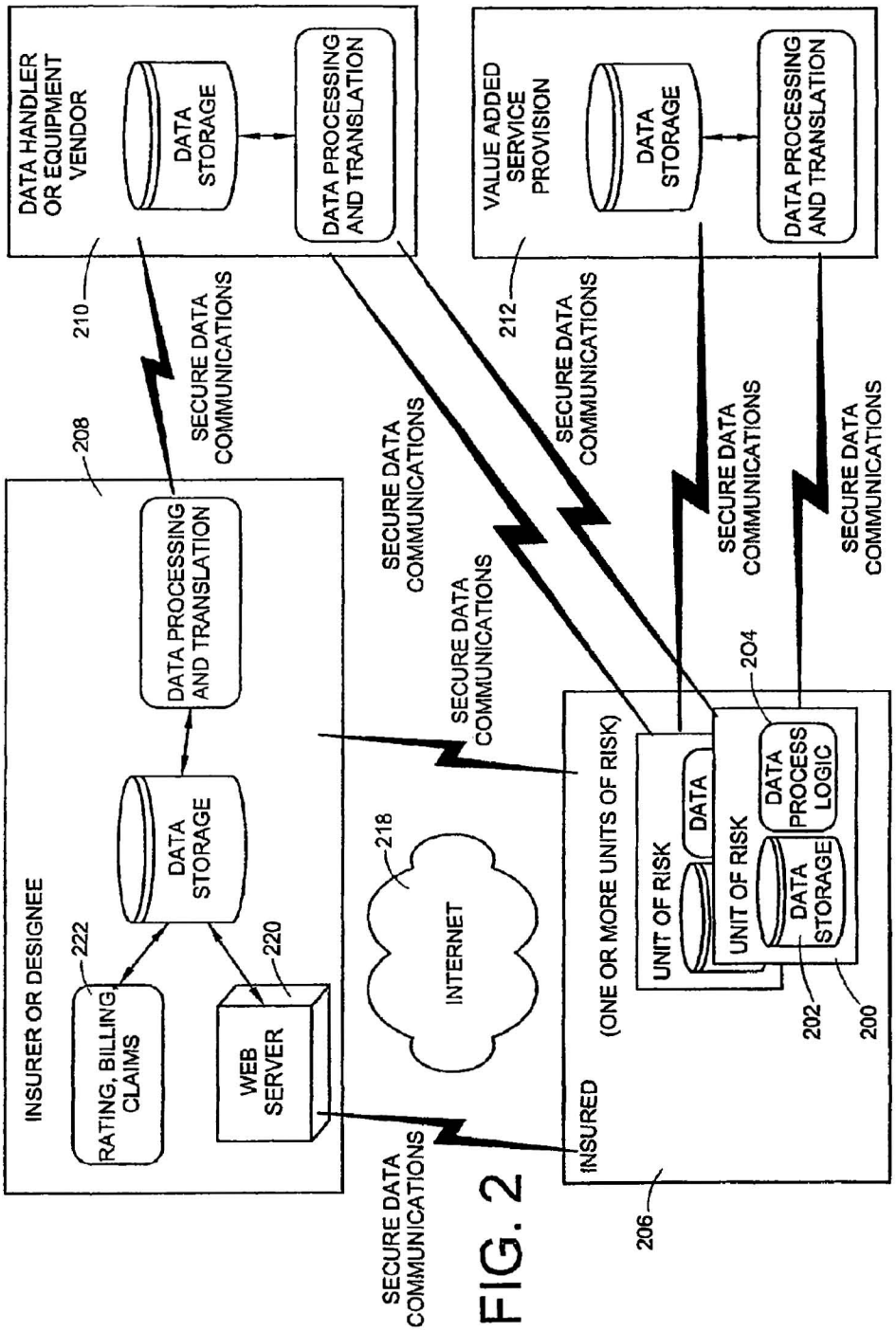
DATA HANDLER OR EQUIPMENT VENDOR
DATA STORAGE
DATA PROCESSING AND TRANSLATION
210
VALUE ADDED SERVICE PROVISION
DATA STORAGE
DATA PROCESSING AND TRANSLATION
212
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
208
INSURER OR DESIGNEE
DATA PROCESSING AND TRANSLATION
DATA STORAGE
222
RATING, BILLING, CLAIMS
220
WEB SERVER
218
INTERNET
204
(ONE OR MORE UNITS OF RISK)
UNIT OF RISK
DATA
UNIT OF RISK
DATA PROCESS LOGIC
DATA STORAGE
202
200
INSURED
206

FIG. 2

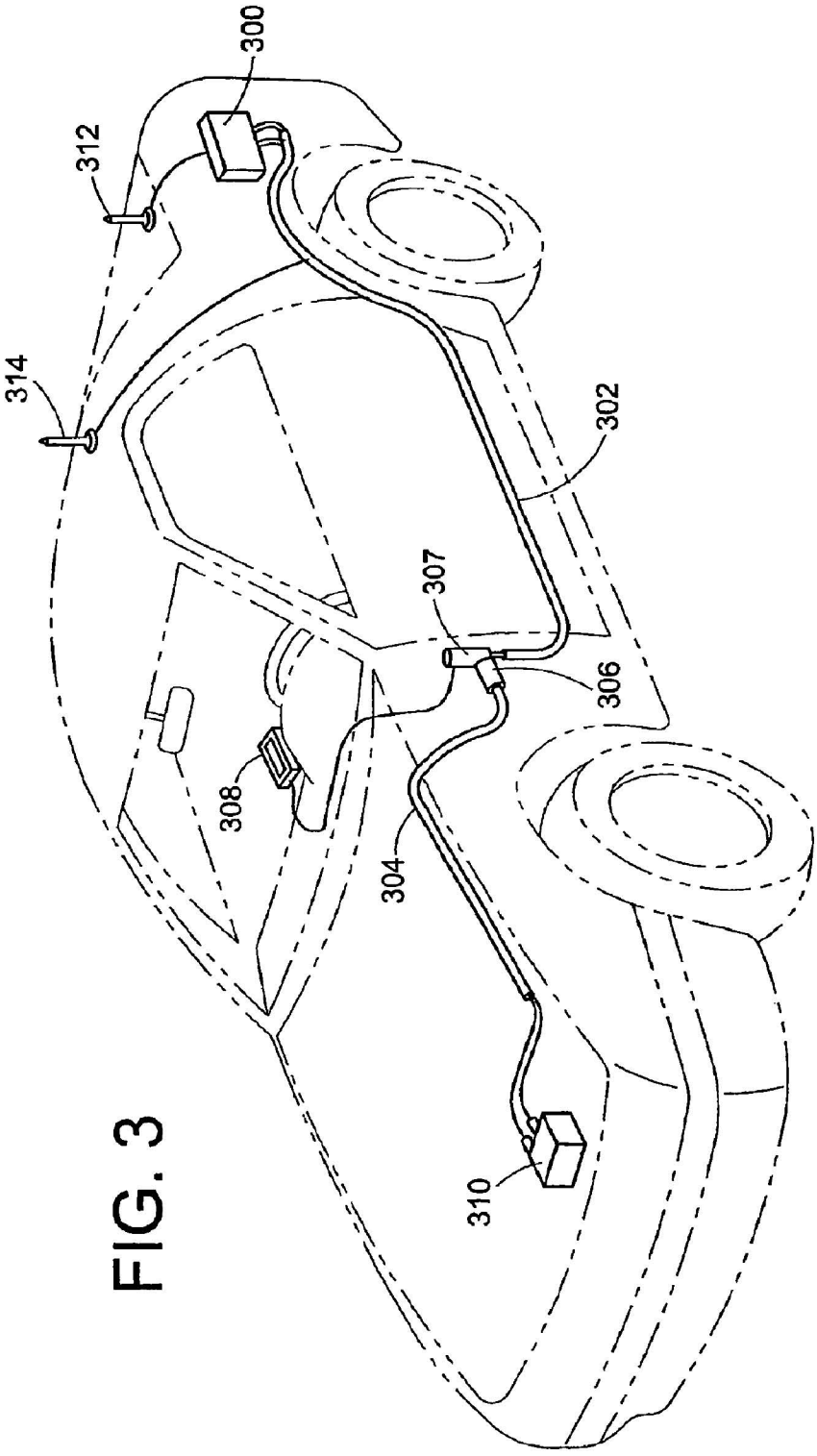

FIG. 3

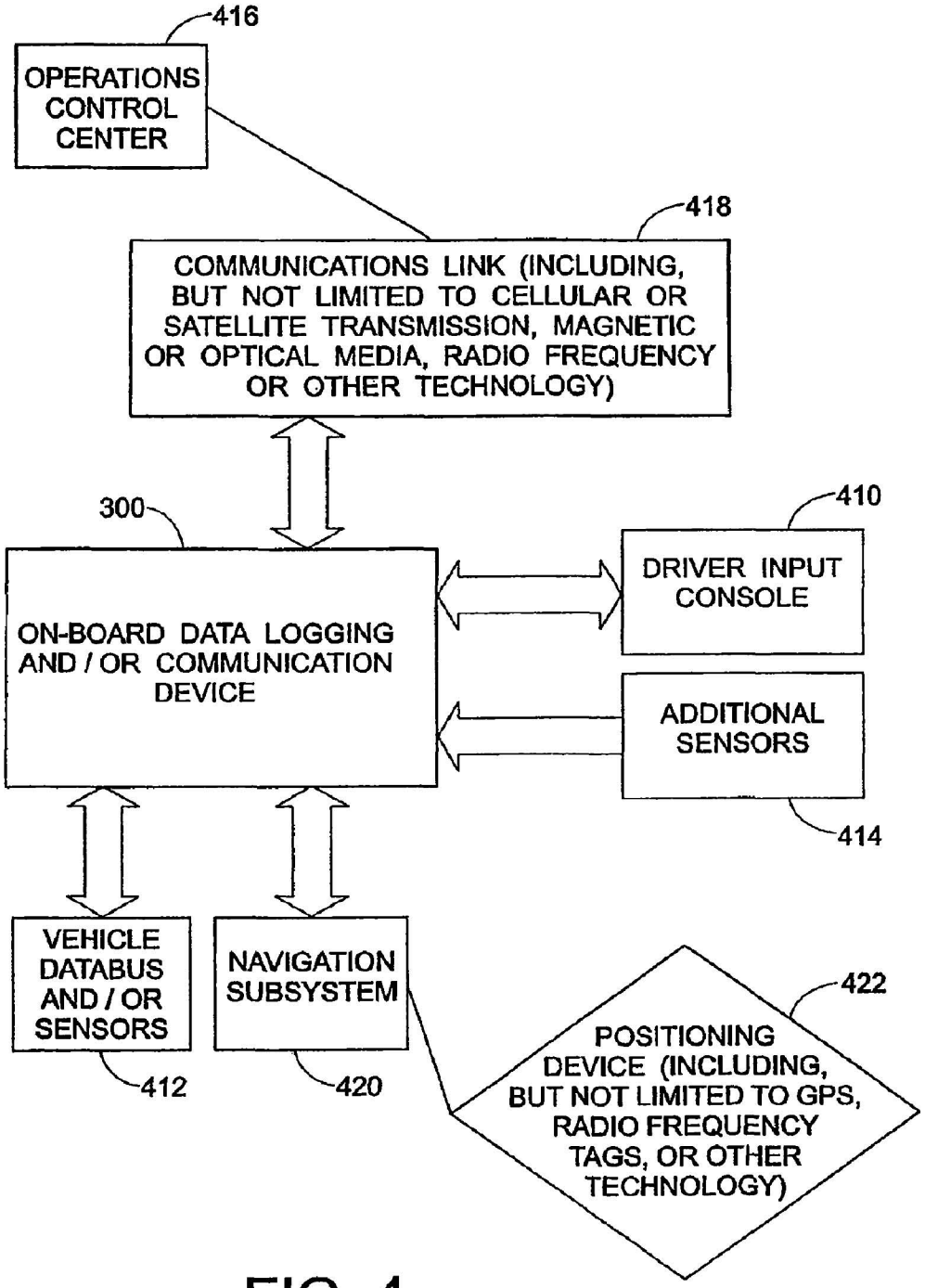
416
OPERATIONS CONTROL CENTER
418
COMMUNICATIONS LINK (INCLUDING, BUT NOT LIMITED TO CELLULAR OR SATELLITE TRANSMISSION, MAGNETIC OR OPTICAL MEDIA, RADIO FREQUENCY OR OTHER TECHNOLOGY)
300
ON-BOARD DATA LOGGING AND / OR COMMUNICATION DEVICE
410
DRIVER INPUT CONSOLE
ADDITIONAL SENSORS
414
VEHICLE DATABUS AND / OR SENSORS
412
NAVIGATION SUBSYSTEM
420
422
POSITIONING DEVICE (INCLUDING, BUT NOT LIMITED TO GPS, RADIO FREQUENCY TAGS, OR OTHER TECHNOLOGY)

FIG. 4

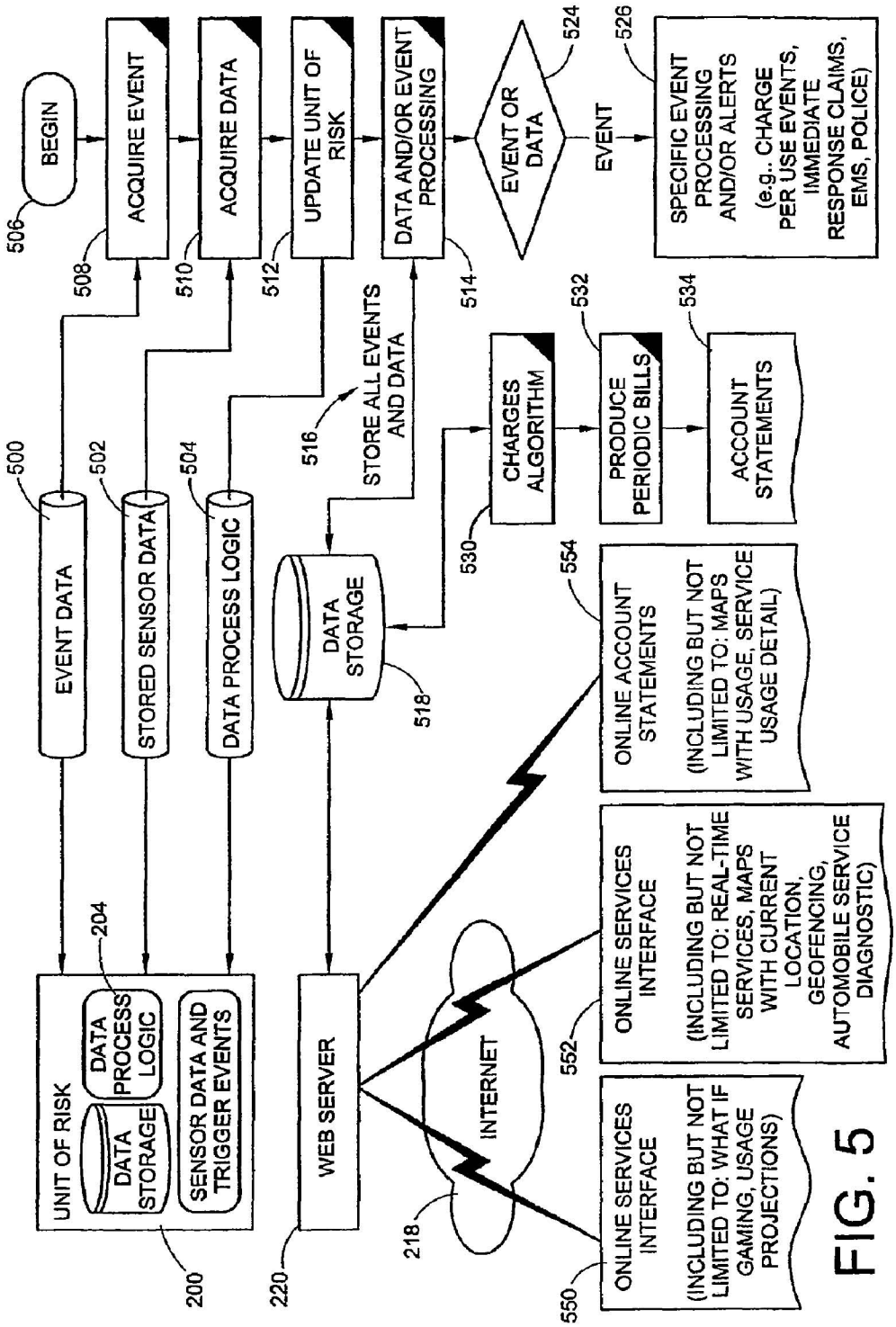
BEGIN
506
ACQUIRE EVENT
508
ACQUIRE DATA
510
UPDATE UNIT OF RISK
512
DATA AND/OR EVENT PROCESSING
514
EVENT OR DATA
524
EVENT
526
SPECIFIC EVENT PROCESSING AND/OR ALERTS
(e.g.. CHARGE PER USE EVENTS, IMMEDIATE RESPONSE CLAIMS, EMS, POLICE)
500
EVENT DATA
502
STORED SENSOR DATA
504
DATA PROCESS LOGIC
516
STORE ALL EVENTS AND DATA
CHARGES ALGORITHM
530
532
PRODUCE PERIODIC BILLS
534
ACCOUNT STATEMENTS
DATA STORAGE
518
554
ONLINE ACCOUNT STATEMENTS
(INCLUDING BUT NOT LIMITED TO: MAPS WITH USAGE, SERVICE USAGE DETAIL)
UNIT OF RISK
204
DATA PROCESS LOGIC
DATA STORAGE
SENSOR DATA AND TRIGGER EVENTS
200
WEB SERVER
220
INTERNET
218
552
ONLINE SERVICES INTERFACE
(INCLUDING BUT NOT LIMITED TO: REAL-TIME SERVICES, MAPS WITH CURRENT LOCATION, GEOFENCING, AUTOMOBILE SERVICE DIAGNOSTIC)
550
ONLINE SERVICES INTERFACE
(INCLUDING BUT NOT LIMITED TO: WHAT IF GAMING, USAGE PROJECTIONS)

FIG. 5

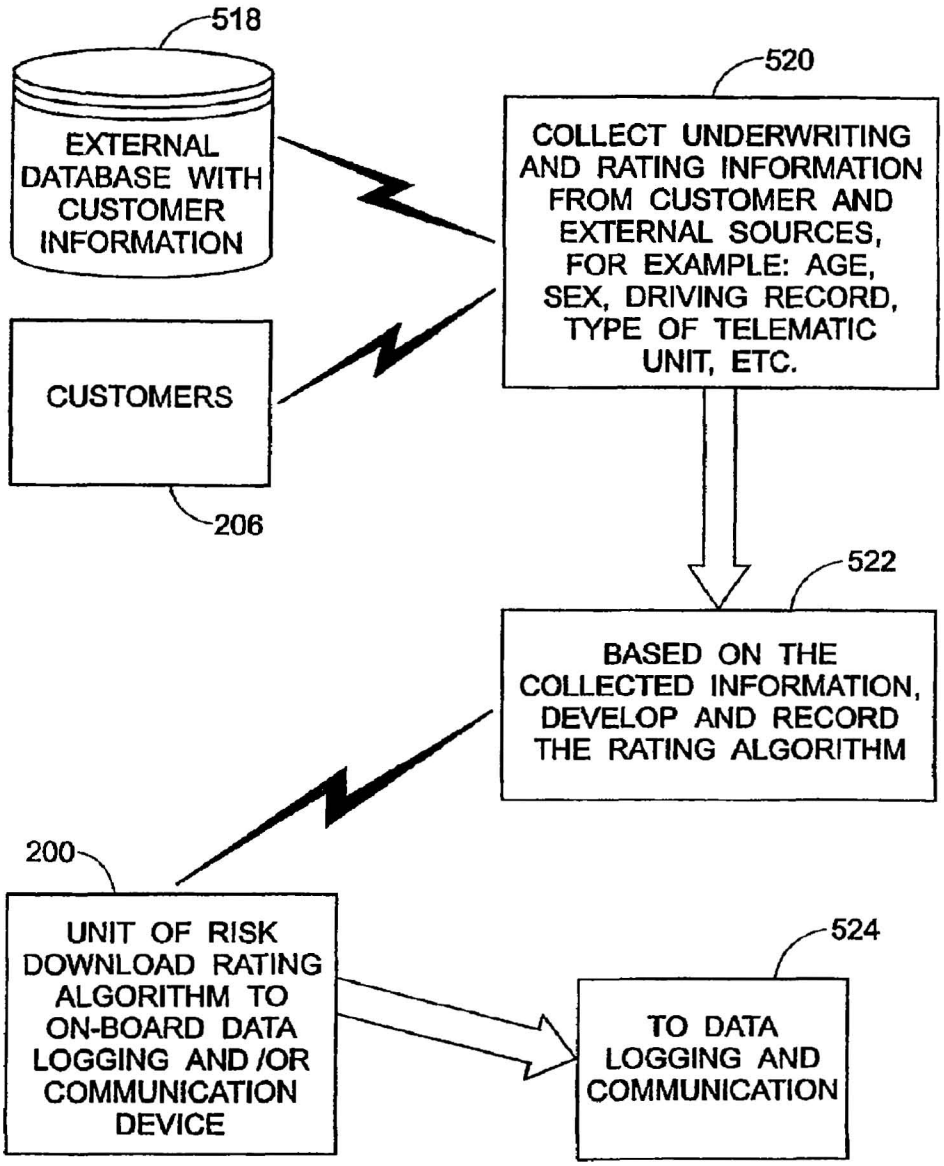
518
EXTERNAL DATABASE WITH CUSTOMER INFORMATION
520
COLLECT UNDERWRITING AND RATING INFORMATION FROM CUSTOMER AND EXTERNAL SOURCES, FOR EXAMPLE: AGE, SEX, DRIVING RECORD, TYPE OF TELEMATIC UNIT, ETC.
CUSTOMERS
206
522
BASED ON THE COLLECTED INFORMATION, DEVELOP AND RECORD THE RATING ALGORITHM
200
UNIT OF RISK DOWNLOAD RATING ALGORITHM TO ON-BOARD DATA LOGGING AND /OR COMMUNICATION DEVICE
524
TO DATA LOGGING AND COMMUNICATION

FIG. 6

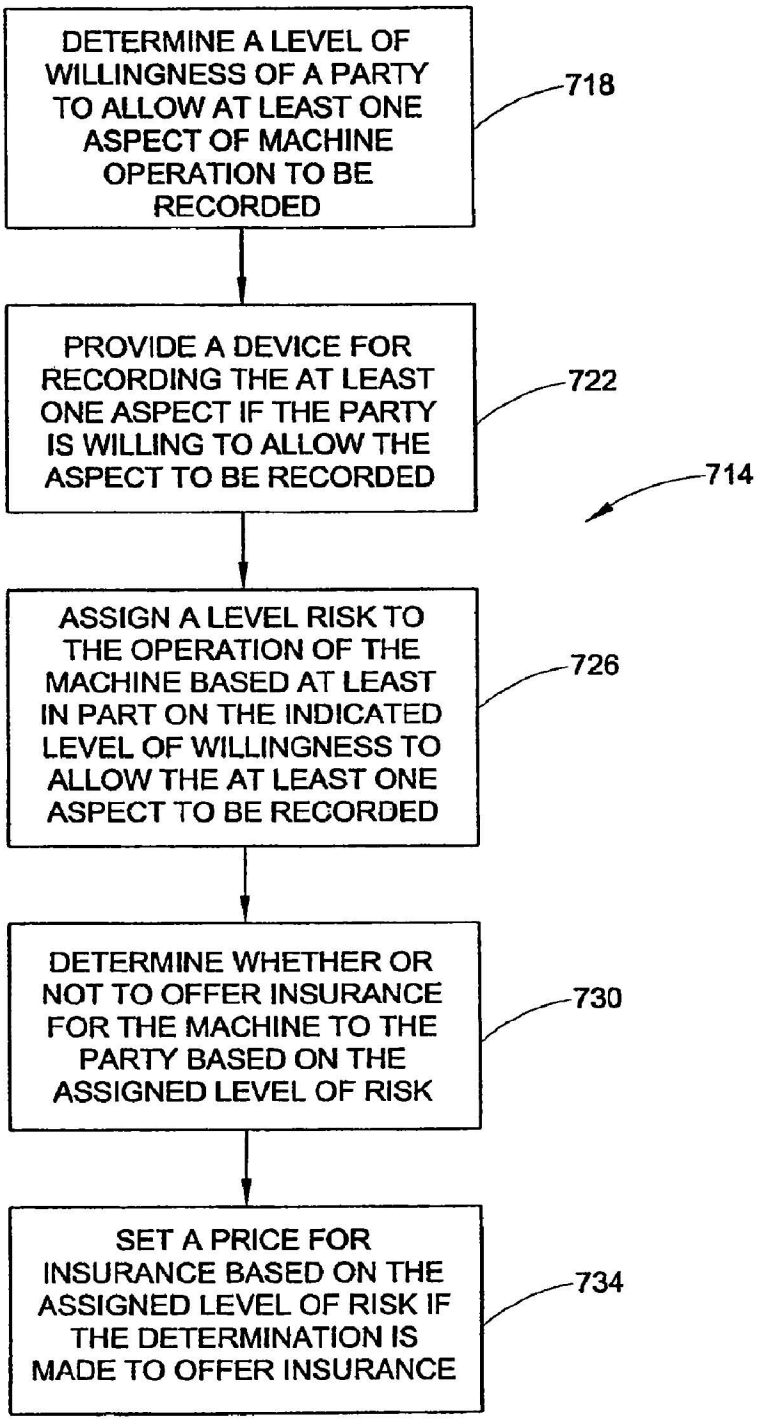
DETERMINE A LEVEL OF WILLINGNESS OF A PARTY TO ALLOW AT LEAST ONE ASPECT OF MACHINE OPERATION TO BE RECORDED
718
PROVIDE A DEVICE FOR RECORDING THE AT LEAST ONE ASPECT IF THE PARTY IS WILLING TO ALLOW THE ASPECT TO BE RECORDED
722
714
ASSIGN A LEVEL RISK TO THE OPERATION OF THE MACHINE BASED AT LEAST IN PART ON THE INDICATED LEVEL OF WILLINGNESS TO ALLOW THE AT LEAST ONE ASPECT TO BE RECORDED
726
DETERMINE WHETHER OR NOT TO OFFER INSURANCE FOR THE MACHINE TO THE PARTY BASED ON THE ASSIGNED LEVEL OF RISK
730
SET A PRICE FOR INSURANCE BASED ON THE ASSIGNED LEVEL OF RISK IF THE DETERMINATION IS MADE TO OFFER INSURANCE
734

FIG. 7

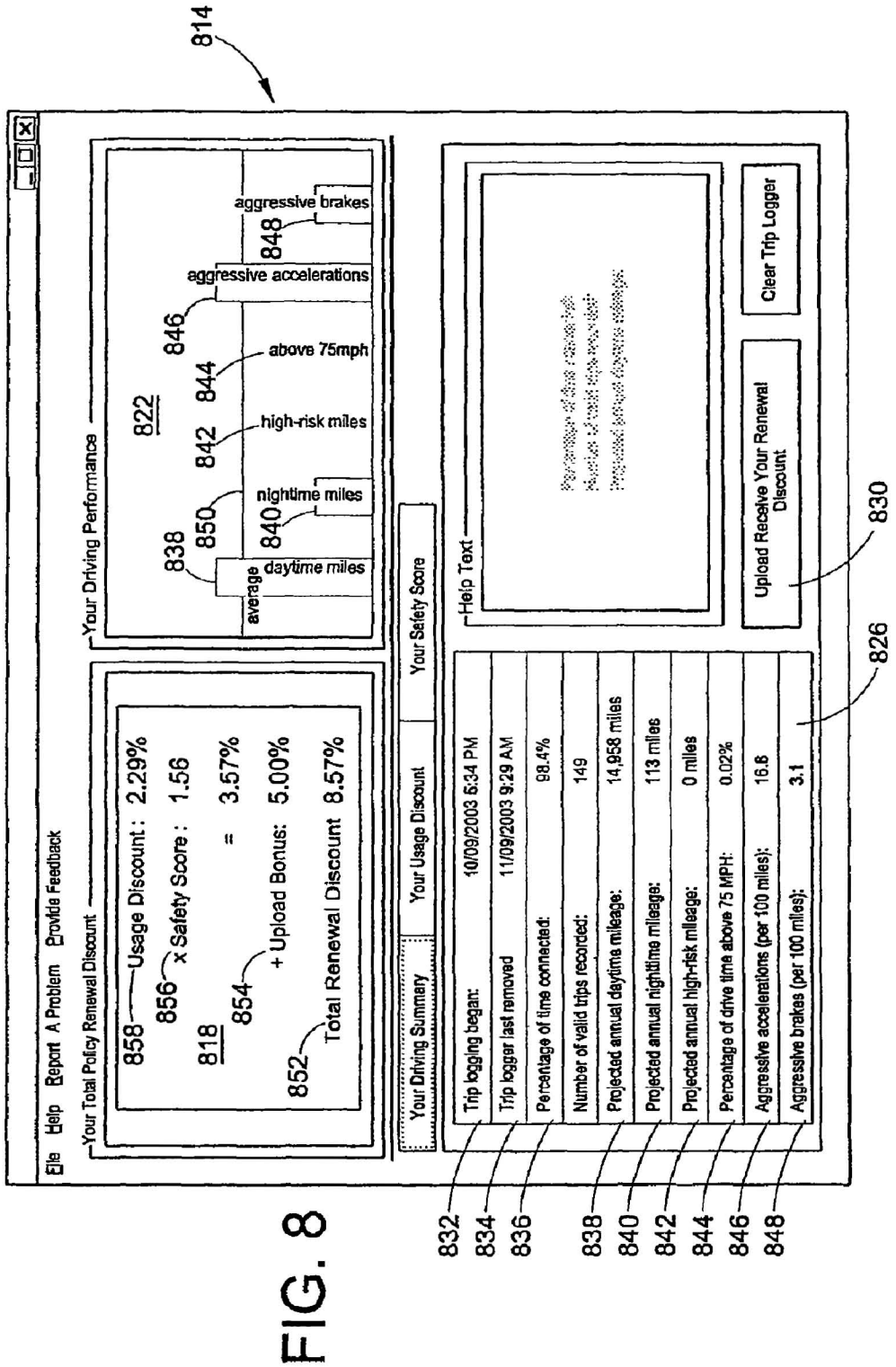
814
File Help Report A Problem Provide Feedback
Your Total Policy Renewal Discount
858 Usage Discount: 2.29%
856 x Safety Score: 1.56
818 = 3.57%
854 + Upload Bonus: 5.00%
852 Total Renewal Discount 8.57%
Your Driving Performance
822
838 average
850 daytime miles
840 nighttime miles
842 high-risk miles
844 above 75mph
846 aggressive accelerations
848 aggressive brakes
Your Driving Summary
Your Usage Discount
Your Safety Score
Help Text
Upload Receive Your Renewal Discount
830
Clear Trip Logger
826
832 Trip logging began: 10/09/2003 5:34 PM
834 Trip logger last removed 11/09/2003 9:29 AM
836 Percentage of time connected: 98.4%
838 Number of valid trips recorded: 149
840 Projected annual daytime mileage: 14,958 miles
842 Projected annual nighttime mileage: 113 miles
844 Projected annual high-risk mileage: 0 miles
846 Percentage of drive time above 75 MPH: 0.02%
848 Aggressive accelerations (per 100 miles): 16.8
Aggressive brakes (per 100 miles): 3.1

FIG. 8

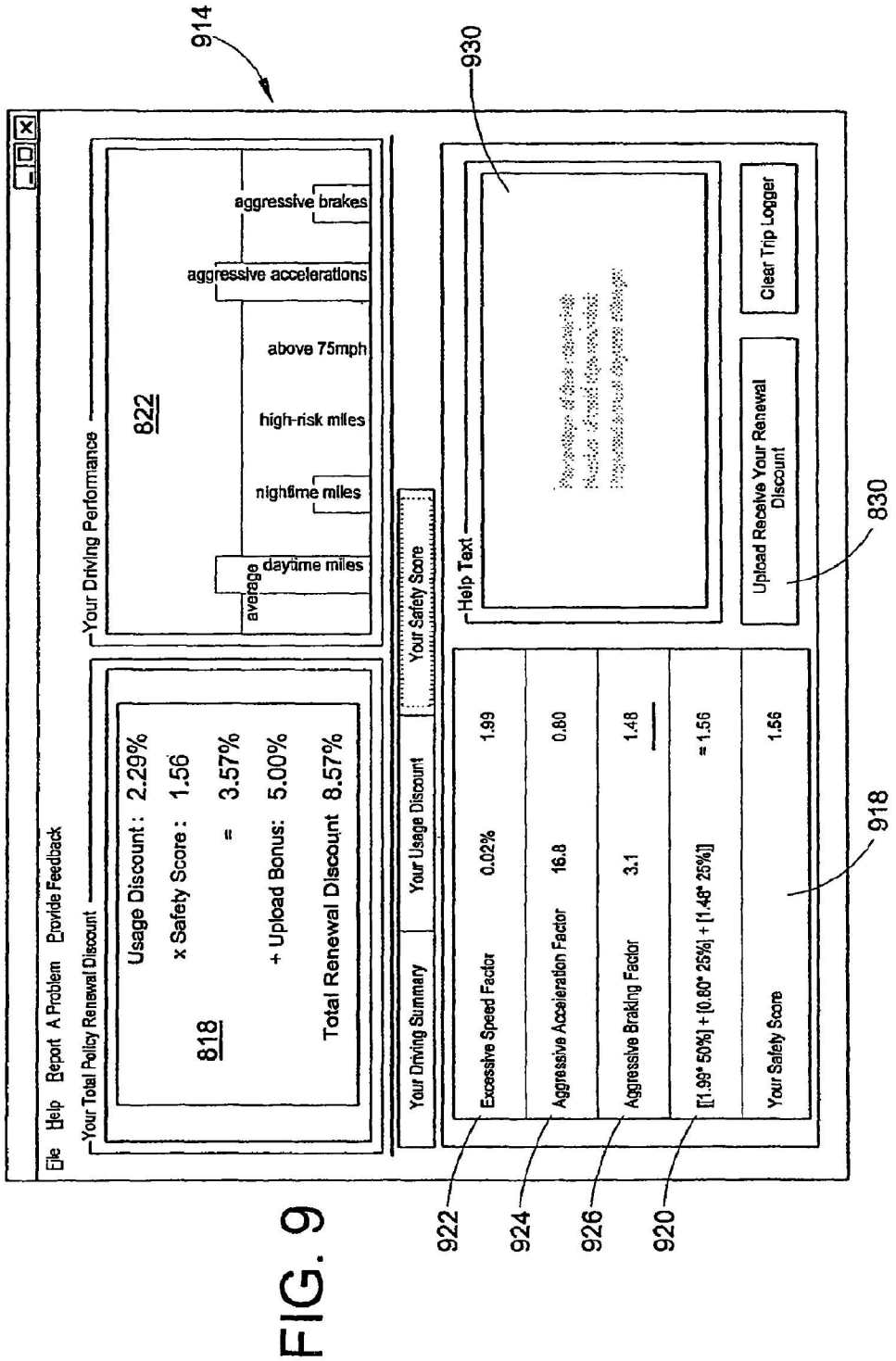
914
930
File Help Report A Problem Provide Feedback
Your Total Policy Renewal Discount
Usage Discount: 2.29%
x Safety Score: 1.56
818
= 3.57%
+ Upload Bonus: 5.00%
Total Renewal Discount 8.57%
Your Driving Performance
822
aggressive brakes
aggressive accelerations
above 75mph
high-risk miles
nighttime miles
daytime miles
average
Your Safety Score
Your Driving Summary
Your Usage Discount
Help Text
Clear Trip Logger
Upload Receive Your Renewal Discount
830
Excessive Speed Factor 0.02% 1.99
Aggressive Acceleration Factor 16.8 0.80
Aggressive Braking Factor 3.1 1.48
[[1.99* 50%] + [0.80* 25%] + [1.48* 25%]] = 1.56
Your Safety Score 1.56
918
922
924
926
920

FIG. 9

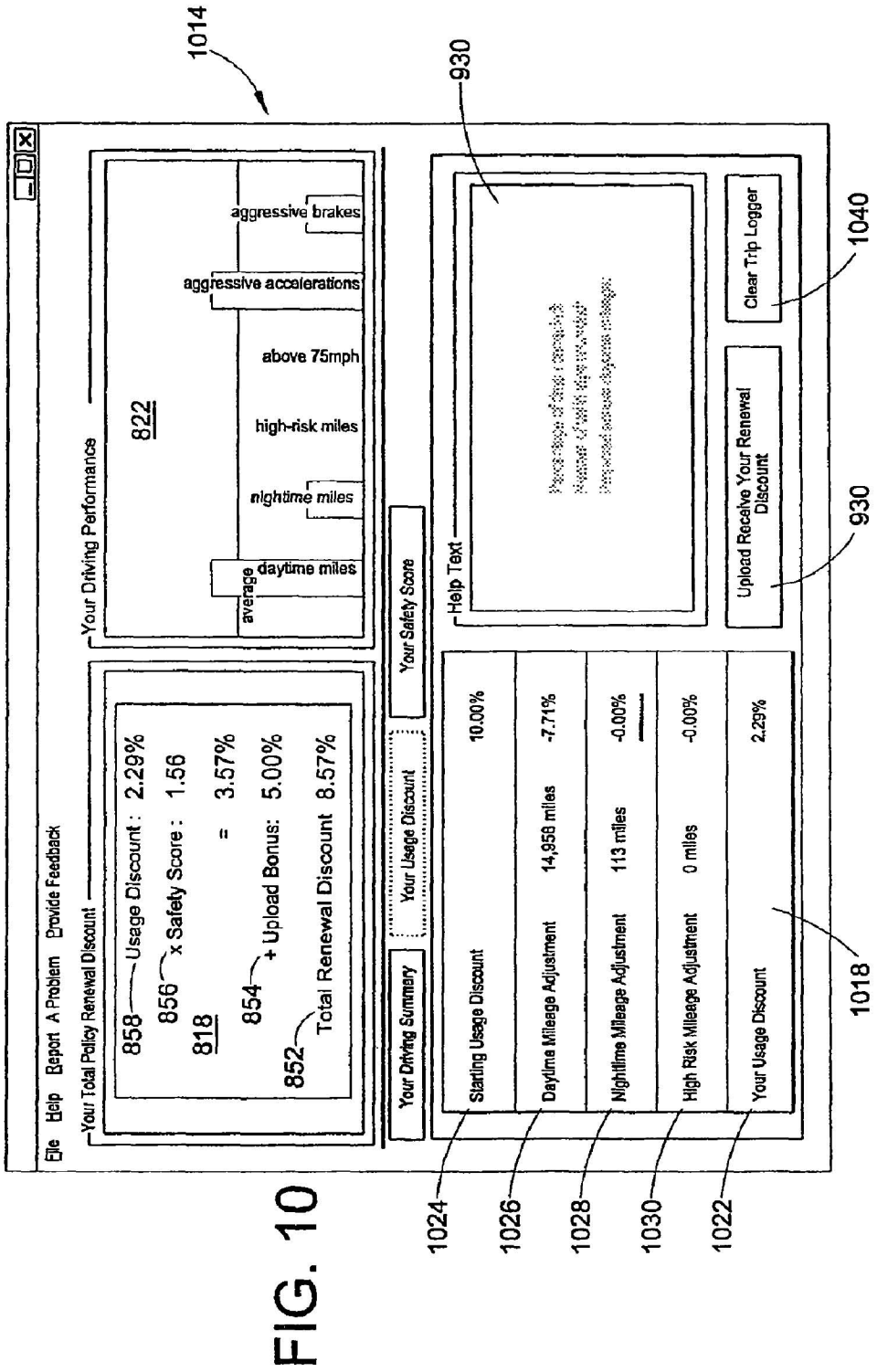
1014
930
File Help Report A Problem Provide Feedback
Your Total Policy Renewal Discount
858 Usage Discount : 2.29%
856 x Safety Score : 1.56
818 = 3.57%
854 + Upload Bonus: 5.00%
852 Total Renewal Discount 8.57%
Your Driving Performance
822
aggressive brakes
aggressive accelerations
above 75mph
high-risk miles
nightime miles
daytime miles
average
Your Safety Score
Your Usage Discount
Your Driving Summary
Help Text
Clear Trip Logger
1040
Upload Receive Your Renewal Discount
930
Starting Usage Discount 10.00%
Daytime Mileage Adjustment 14,958 miles -7.71%
Nightime Mileage Adjustment 113 miles -0.00%
High Risk Mileage Adjustment 0 miles -0.00%
Your Usage Discount 2.29%
1018
1024
1026
1028
1030
1022

FIG. 10

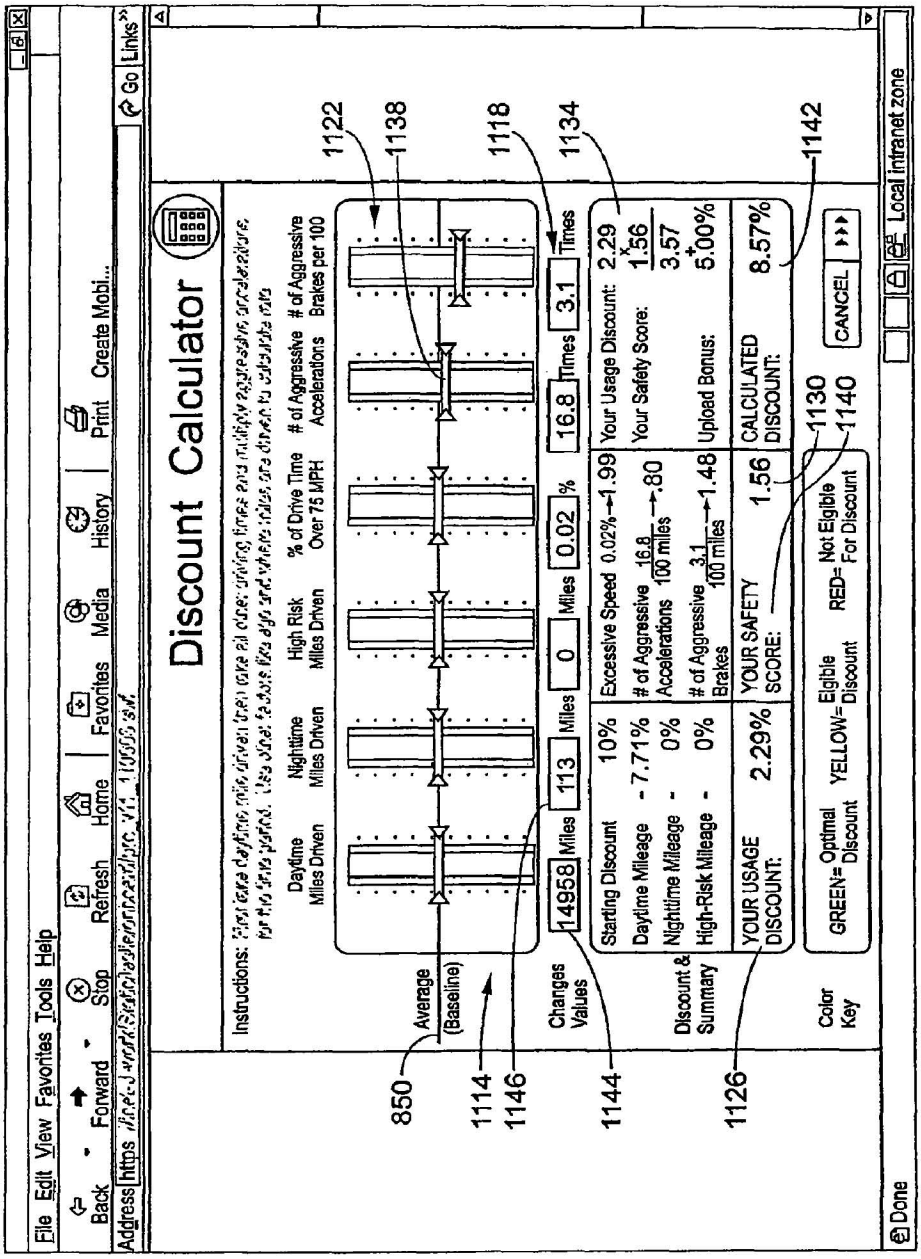
Discount Calculator
Instructions:
Daytime Miles Driven
Nighttime Miles Driven
High Risk Miles Driven
% of Drive Time Over 75 MPH
# of Aggressive Accelerations
# of Aggressive Brakes per 100
Average (Baseline)
Changes Values
Discount & Summary
Color Key
14958 Miles
113 Miles
0 Miles
0.02 %
16.8 Times
3.1 Times
Starting Discount 10%
Daytime Mileage - 7.71%
Nighttime Mileage - 0%
High-Risk Mileage - 0%
YOUR USAGE DISCOUNT: 2.29%
Excessive Speed 0.02% → 1.99
# of Aggressive Accelerations 16.8 / 100 miles → .80
# of Aggressive Brakes 3.1 / 100 miles → 1.48
YOUR SAFETY SCORE: 1.56
GREEN= Optimal Discount
YELLOW= Eligible Discount
RED= Not Eligible For Discount
Your Usage Discount: 2.29
Your Safety Score: 1.56 / 3.57
Upload Bonus: + 5.00%
CALCULATED DISCOUNT: 8.57%
CANCEL
850
1114
1146
1144
1126
1122
1138
1118
1134
1142
1130
1140
Done
Local intranet zone

FIG. 11

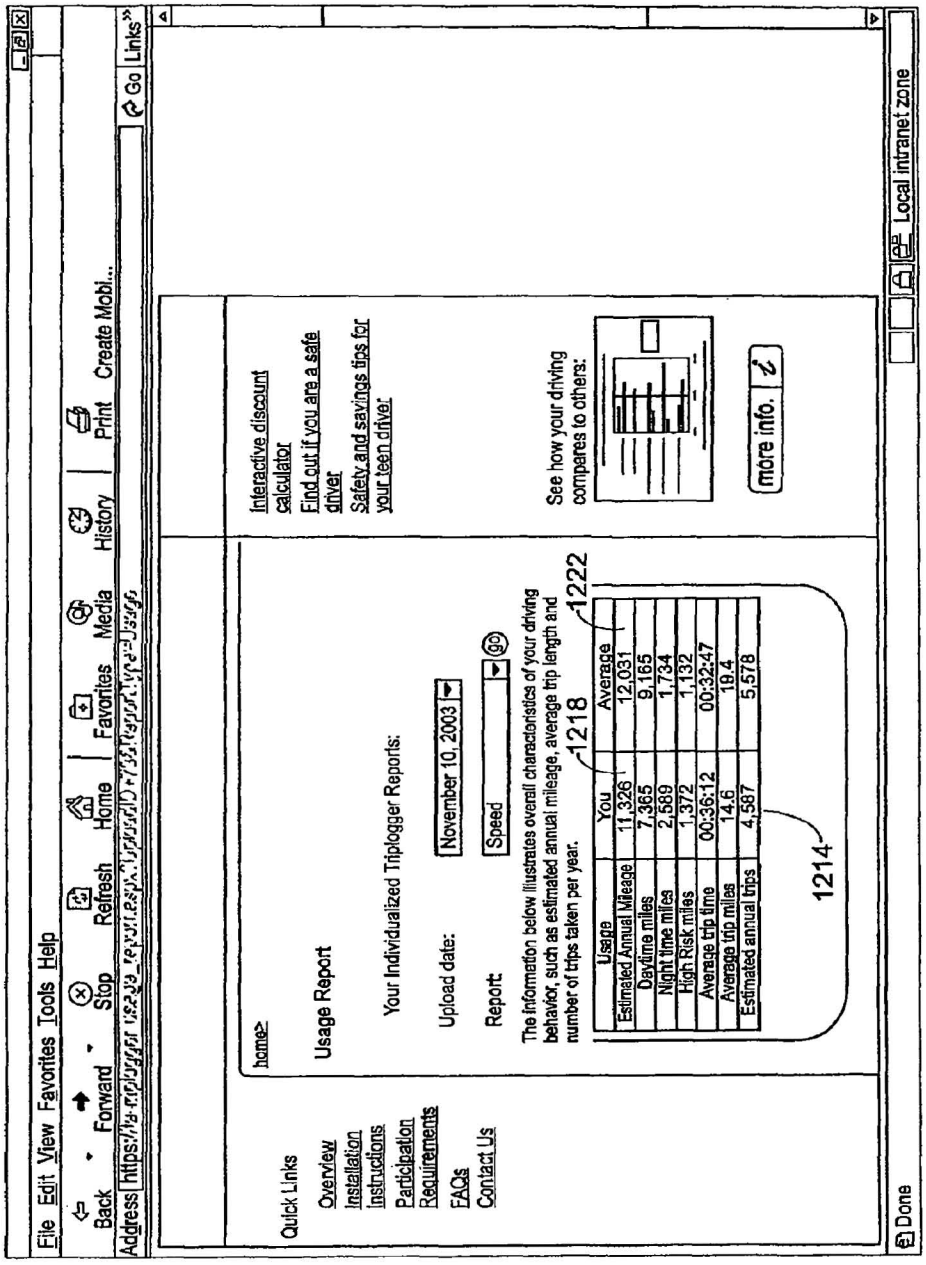
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address https://my.triplogger.usage_report.Triplogger_Usage
Go Links
Quick Links
Overview
Installation Instructions
Participation Requirements
FAQs
Contact Us
home>
Usage Report
Your Individualized Triplogger Reports:
Upload date: November 10, 2003
Report: Speed go
The information below illustrates overall characteristics of your driving behavior, such as estimated annual mileage, average trip length and number of trips taken per year.
1218
1222
Usage | You | Average
Estimated Annual Mileage | 11,326 | 12,031
Daytime miles | 7,365 | 9,165
Night time miles | 2,589 | 1,734
High Risk miles | 1,372 | 1,132
Average trip time | 00:36:12 | 00:32:47
Average trip miles | 14.6 | 19.4
Estimated annual trips | 4,587 | 5,578
1214
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 12

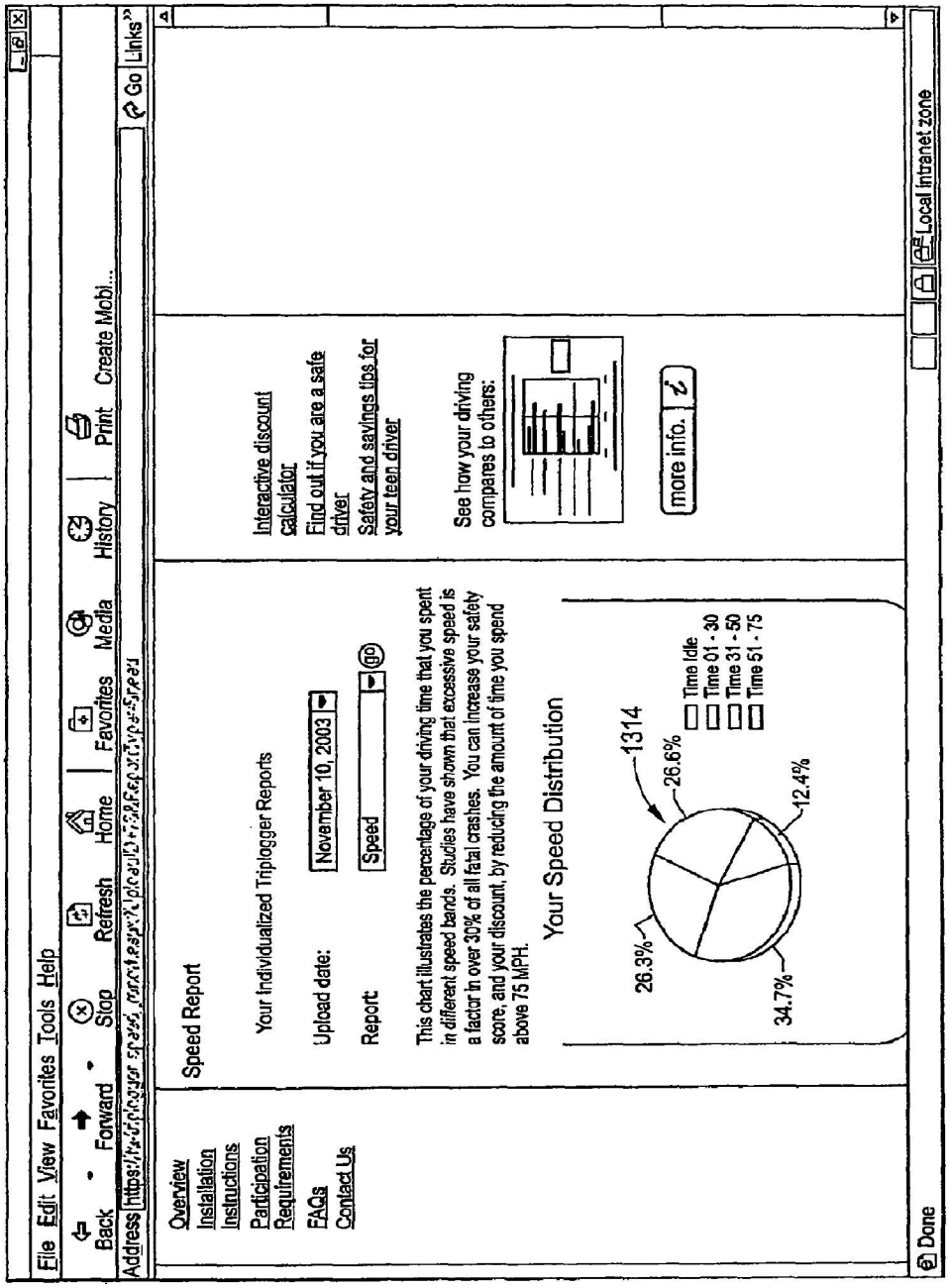
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address
Go Links
Overview
Installation Instructions
Participation Requirements
FAQs
Contact Us
Speed Report
Your Individualized Triplogger Reports
Upload date:
November 10, 2003
Report:
Speed
go
This chart illustrates the percentage of your driving time that you spent in different speed bands. Studies have shown that excessive speed is a factor in over 30% of all fatal crashes. You can increase your safety score, and your discount, by reducing the amount of time you spend above 75 MPH.
Your Speed Distribution
1314
26.6%
12.4%
34.7%
26.3%
Time Idle
Time 01 - 30
Time 31 - 50
Time 51 - 75
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 13

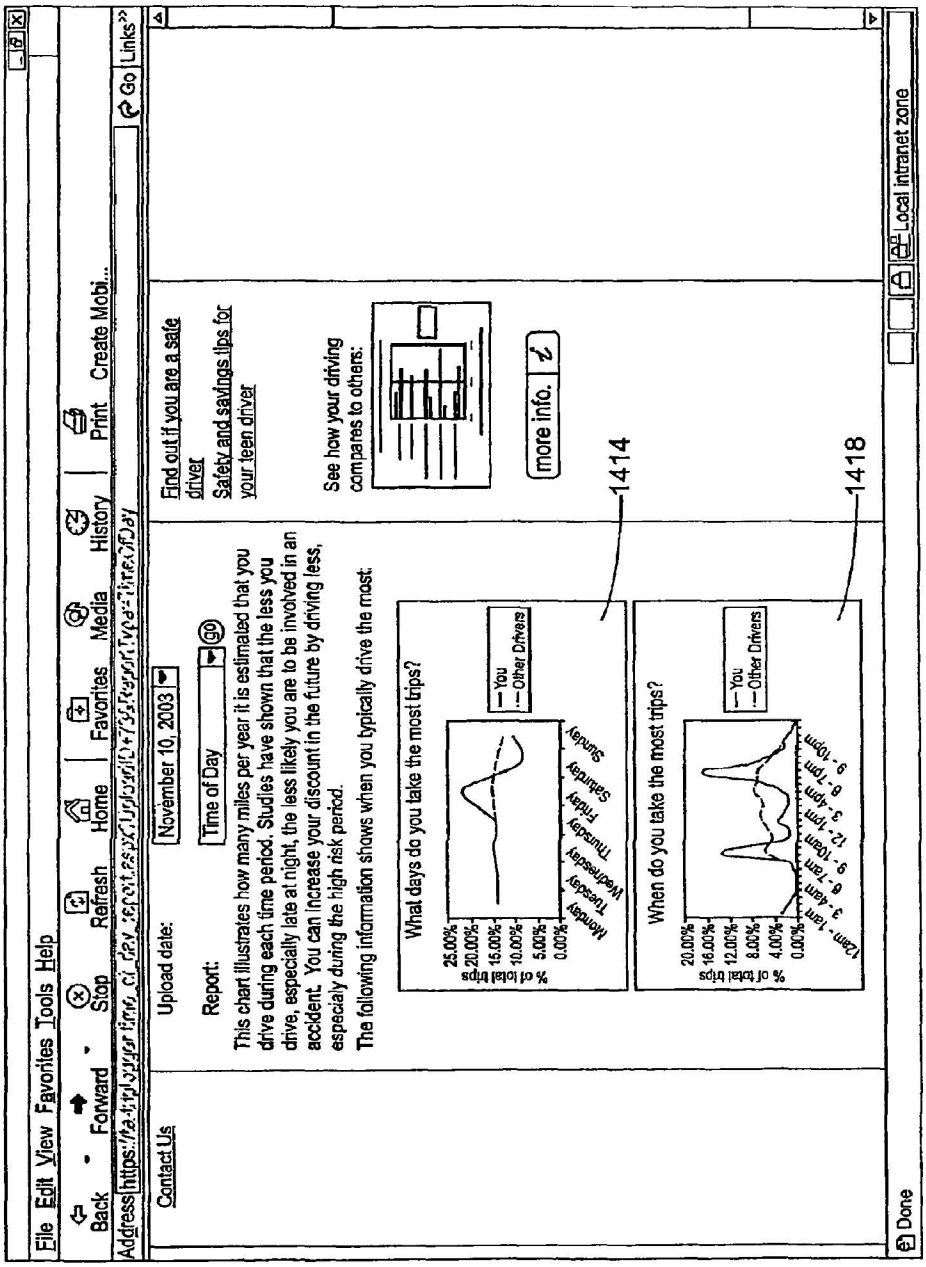
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address
Go Links
Contact Us
Upload date:
November 10, 2003
Report:
Time of Day
go
This chart illustrates how many miles per year it is estimated that you drive during each time period. Studies have shown that the less you drive, especially late at night, the less likely you are to be involved in an accident. You can increase your discount in the future by driving less, especialy during the high risk period.
The following information shows when you typically drive the most.
What days do you take the most trips?
% of total trips
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
You
Other Drivers
1414
When do you take the most trips?
% of total trips
20.00%
16.00%
12.00%
8.00%
4.00%
0.00%
12am - 3am
3 - 6am
6 - 9am
9 - 12pm
12 - 3pm
3 - 6pm
6 - 9pm
9 - 12pm
You
Other Drivers
1418
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 14

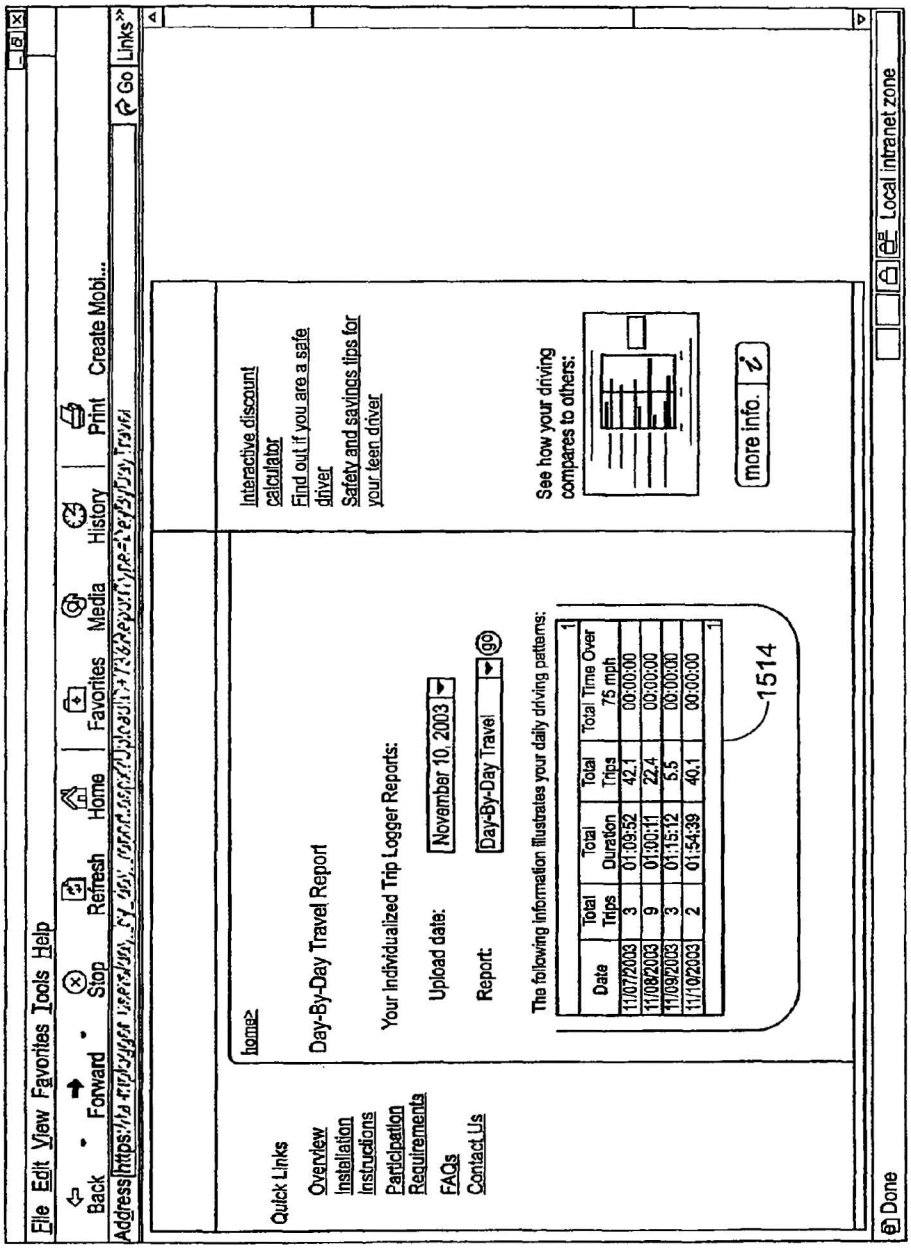
File Edit View Favorites Tools Help
Back
Forward
Stop
Refresh
Home
Favorites
Media
History
Print
Create Mobi...
Address
Go
Links
Quick Links
Overview
Installation Instructions
Participation Requirements
FAQs
Contact Us
Home>
Day-By-Day Travel Report
Your Individualized Trip Logger Reports:
Upload date:
November 10, 2003
Report:
Day-By-Day Travel
go
The following information illustrates your daily driving patterns:
Date
Total Trips
Total Duration
Total Trips
Total Time Over 75 mph
11/07/2003 3 01:09:52 42.1 00:00:00
11/08/2003 9 01:30:11 22.4 00:00:00
11/09/2003 3 01:15:12 5.5 00:00:00
11/10/2003 2 01:54:39 40.1 00:00:00
1514
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 15

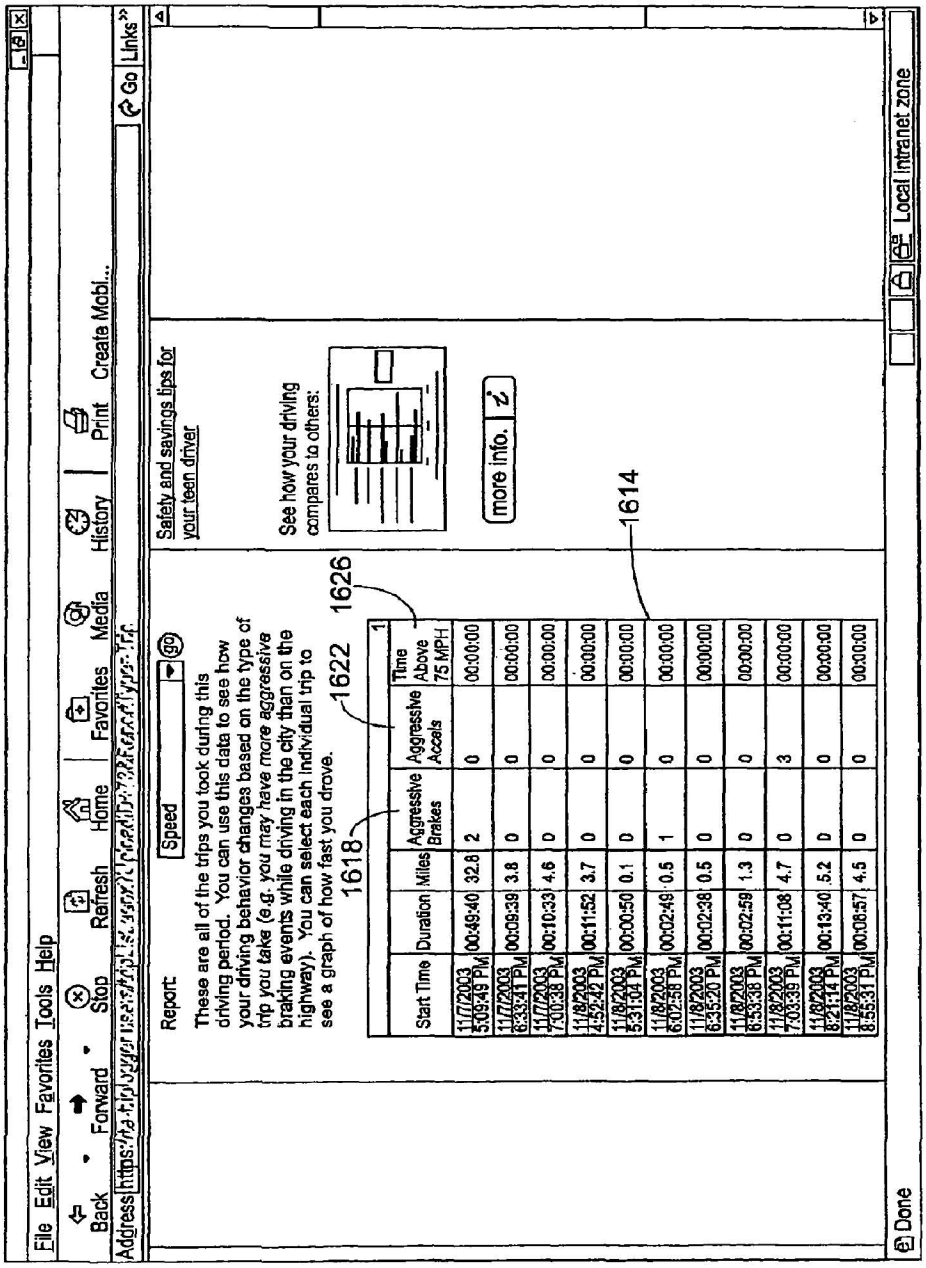
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address https://
Links
Done
Local intranet zone
Report:
Speed
go
These are all of the trips you took during this driving period. You can use this data to see how your driving behavior changes based on the type of trip you take (e.g. you may have more aggressive braking events while driving in the city than on the highway). You can select each individual trip to see a graph of how fast you drove.
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
1618
1622
1626
1614
Start Time
Duration
Miles
Aggressive Brakes
Aggressive Accels
Time Above 75 MPH
11/7/2003 5:09:49 PM 00:49:40 32.8 2 0 00:00:00
11/7/2003 8:33:41 PM 00:09:39 3.8 0 0 00:00:00
11/7/2003 7:00:38 PM 00:10:33 4.6 0 0 00:00:00
11/8/2003 4:52:42 PM 00:11:52 3.7 0 0 00:00:00
11/8/2003 5:31:04 PM 00:00:50 0.1 0 0 00:00:00
11/8/2003 6:02:58 PM 00:02:49 0.5 1 0 00:00:00
11/8/2003 6:35:20 PM 00:02:38 0.5 0 0 00:00:00
11/8/2003 8:53:38 PM 00:02:59 1.3 0 0 00:00:00
11/8/2003 7:03:39 PM 00:11:08 4.7 0 3 00:00:00
11/8/2003 8:21:14 PM 00:13:40 5.2 0 0 00:00:00
11/8/2003 8:55:31 PM 00:08:57 4.5 0 0 00:00:00

FIG. 16

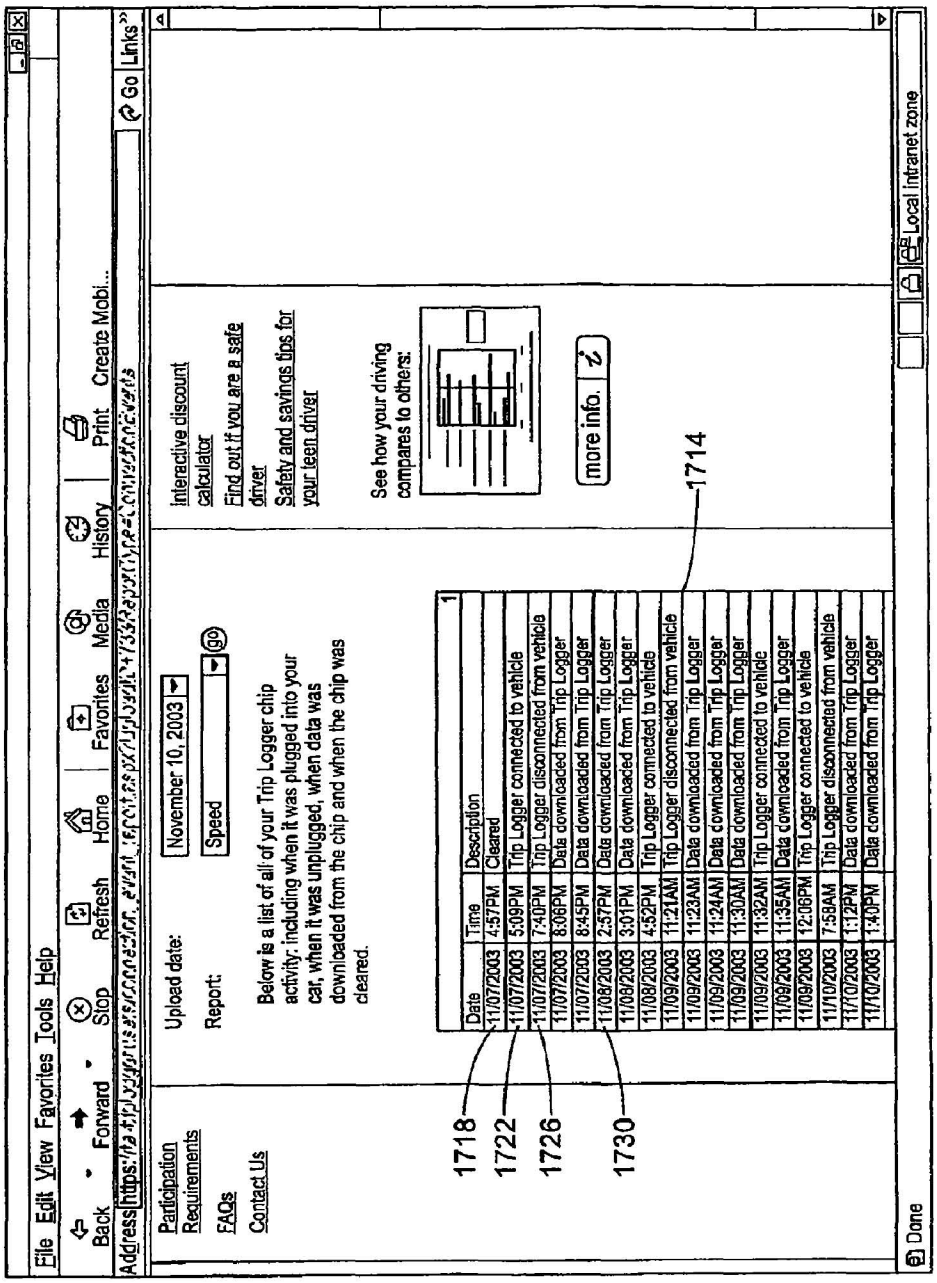
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address
Go Links
Participation Requirements
FAQs
Contact Us
Upload date:
November 10, 2003
Report:
Speed
go
Below is a list of all of your Trip Logger chip activity, including when it was plugged into your car, when it was unplugged, when data was downloaded from the chip and when the chip was cleared.
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
1
Date
Time
Description
11/07/2003 4:57PM Cleared
11/07/2003 5:09PM Trip Logger connected to vehicle
11/07/2003 7:40PM Trip Logger disconnected from vehicle
11/07/2003 8:06PM Data downloaded from Trip Logger
11/07/2003 8:45PM Data downloaded from Trip Logger
11/08/2003 2:57PM Data downloaded from Trip Logger
11/08/2003 3:01PM Data downloaded from Trip Logger
11/08/2003 4:52PM Trip Logger connected to vehicle
11/09/2003 11:21AM Trip Logger disconnected from vehicle
11/09/2003 11:23AM Data downloaded from Trip Logger
11/09/2003 11:24AM Data downloaded from Trip Logger
11/09/2003 11:30AM Data downloaded from Trip Logger
11/09/2003 11:32AM Trip Logger connected to vehicle
11/09/2003 11:35AM Data downloaded from Trip Logger
11/09/2003 12:06PM Trip Logger connected to vehicle
11/10/2003 7:59AM Trip Logger disconnected from vehicle
11/10/2003 11:12PM Data downloaded from Trip Logger
11/10/2003 11:40PM Data downloaded from Trip Logger
1714
1718
1722
1726
1730
Done
Local intranet zone

FIG. 17

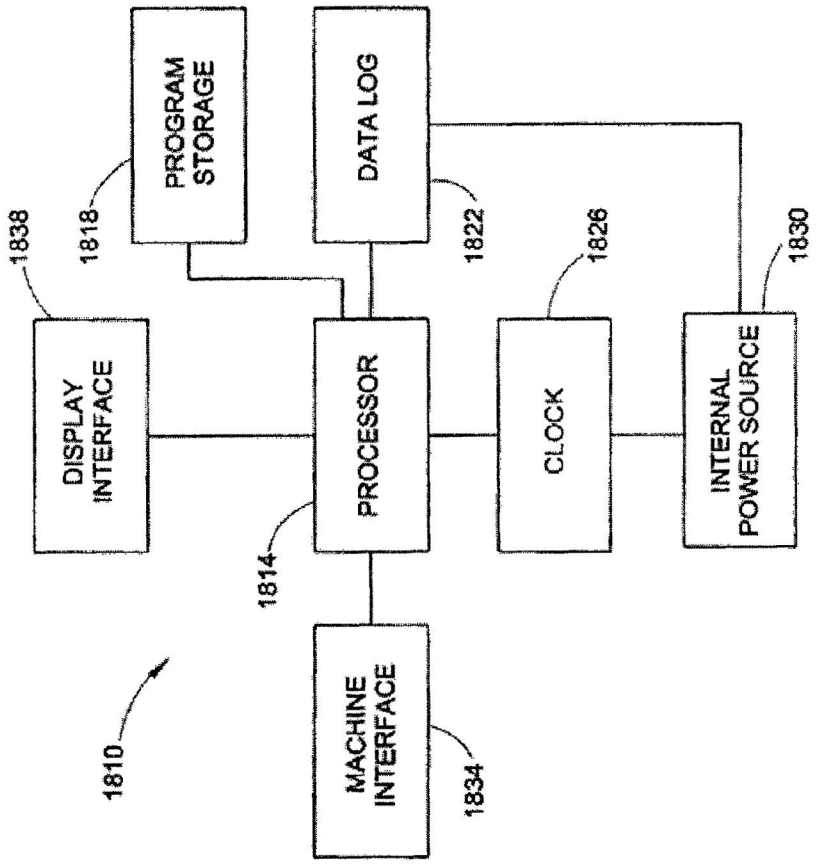
PROGRAM STORAGE
DATA LOG
1818
1822
1826
1830
1838
DISPLAY INTERFACE
PROCESSOR
CLOCK
INTERNAL POWER SOURCE
1814
1810
MACHINE INTERFACE
1834

FIG. 18

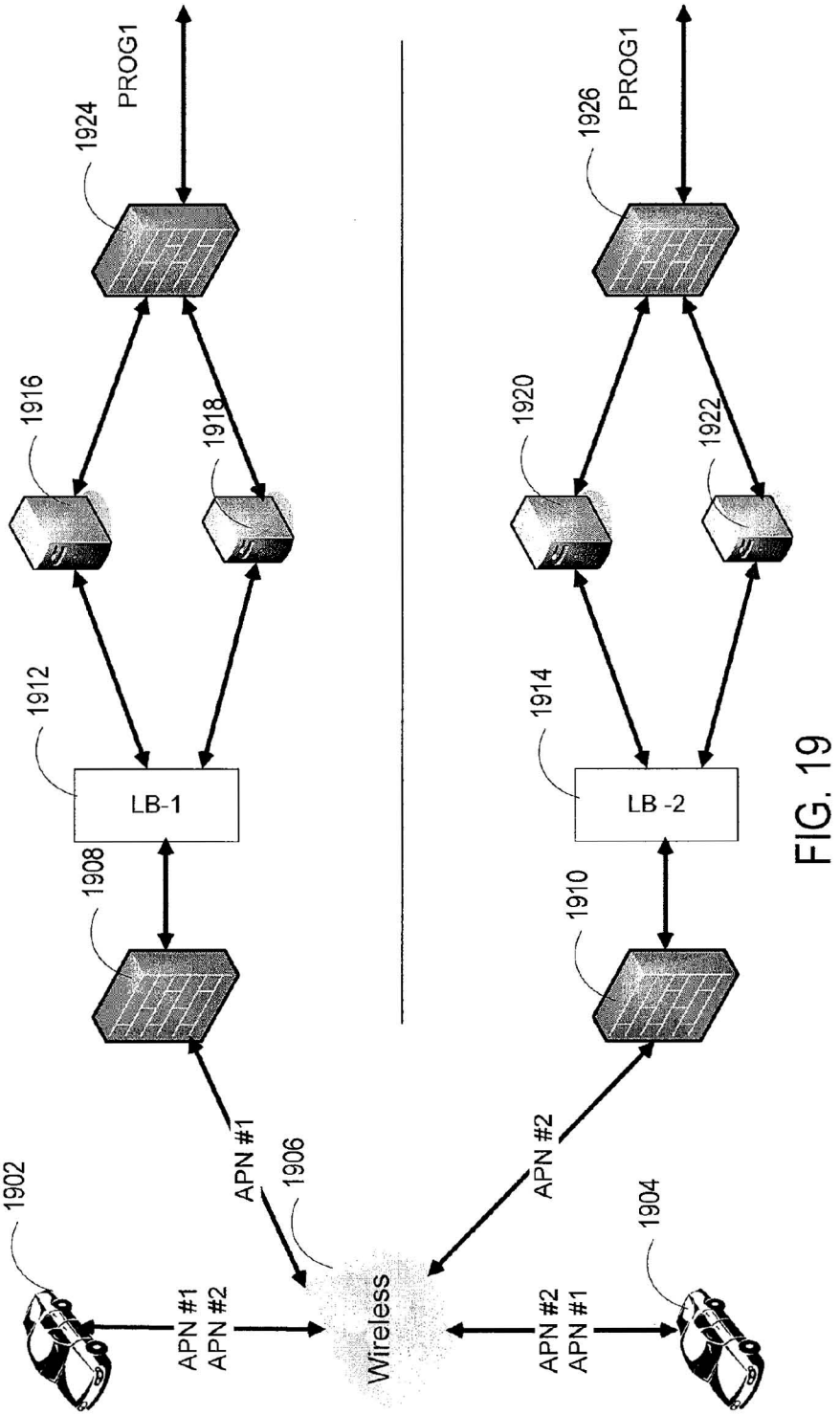
PROG1
1924
1926
PROG1
1916
1918
1920
1922
1912
1914
LB-1
LB -2
1908
1910
APN #1
1906
APN #2
1902
1904
APN #1
APN #2
Wireless
APN #2
APN #1

FIG. 19

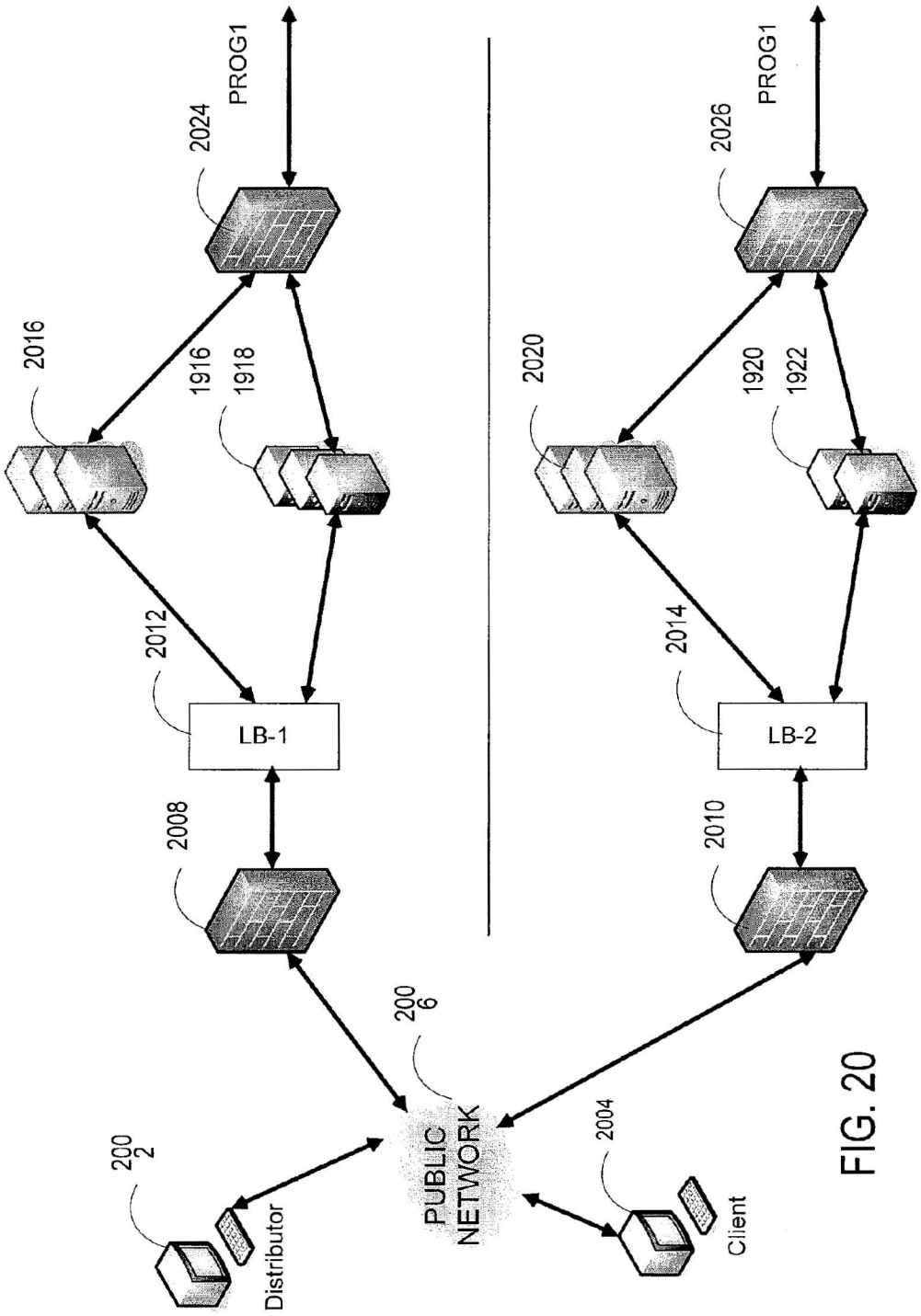
PROG1
2024
2016
1916
1918
2012
LB-1
2008
PROG1
2026
2020
1920
1922
2014
LB-2
2010
2006
PUBLIC NETWORK
2002
Distributor
2004
Client

FIG. 20

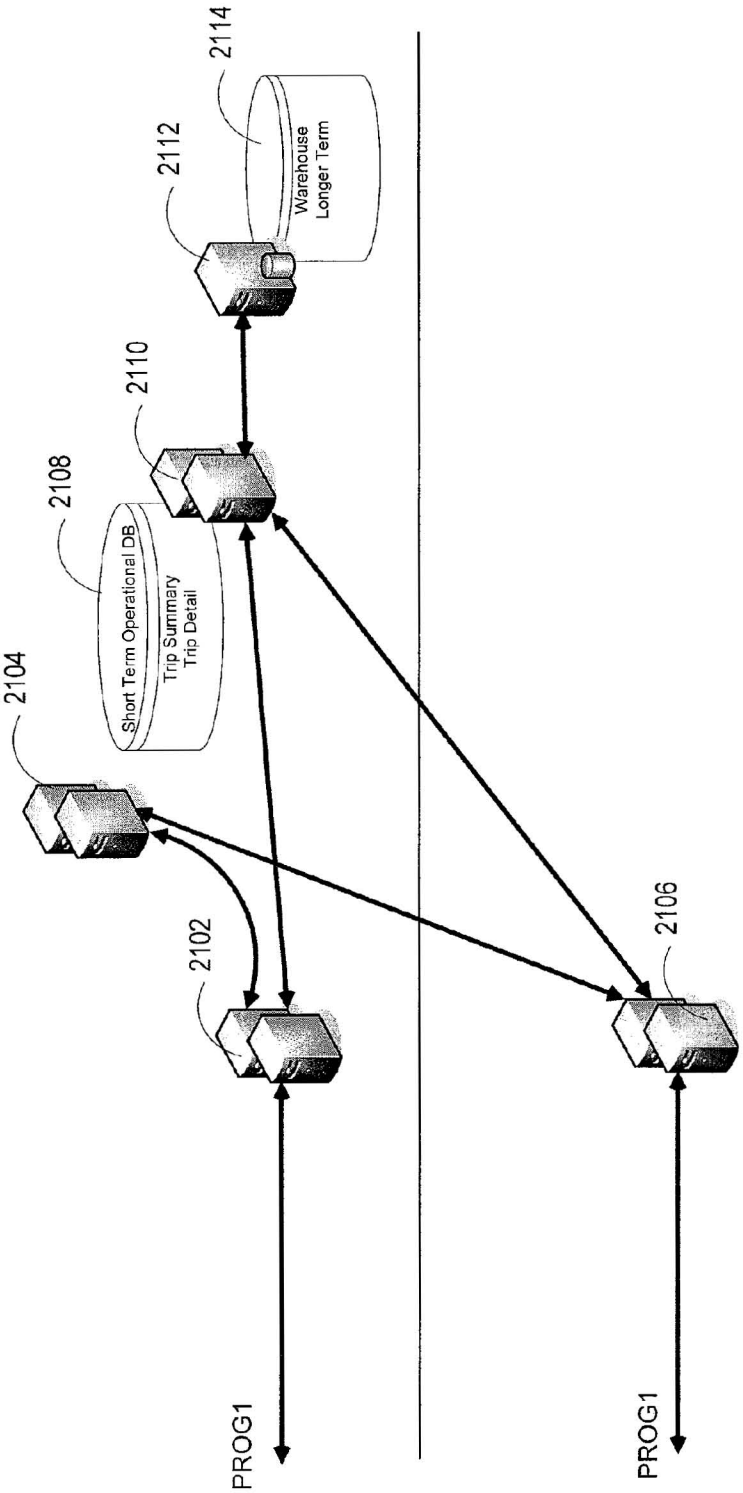
2114
2112
Warehouse
Longer Term
2110
2108
Short Term Operational DB
Trip Summary
Trip Detail
2104
2102
2106
PROG1
PROG1

FIG. 21

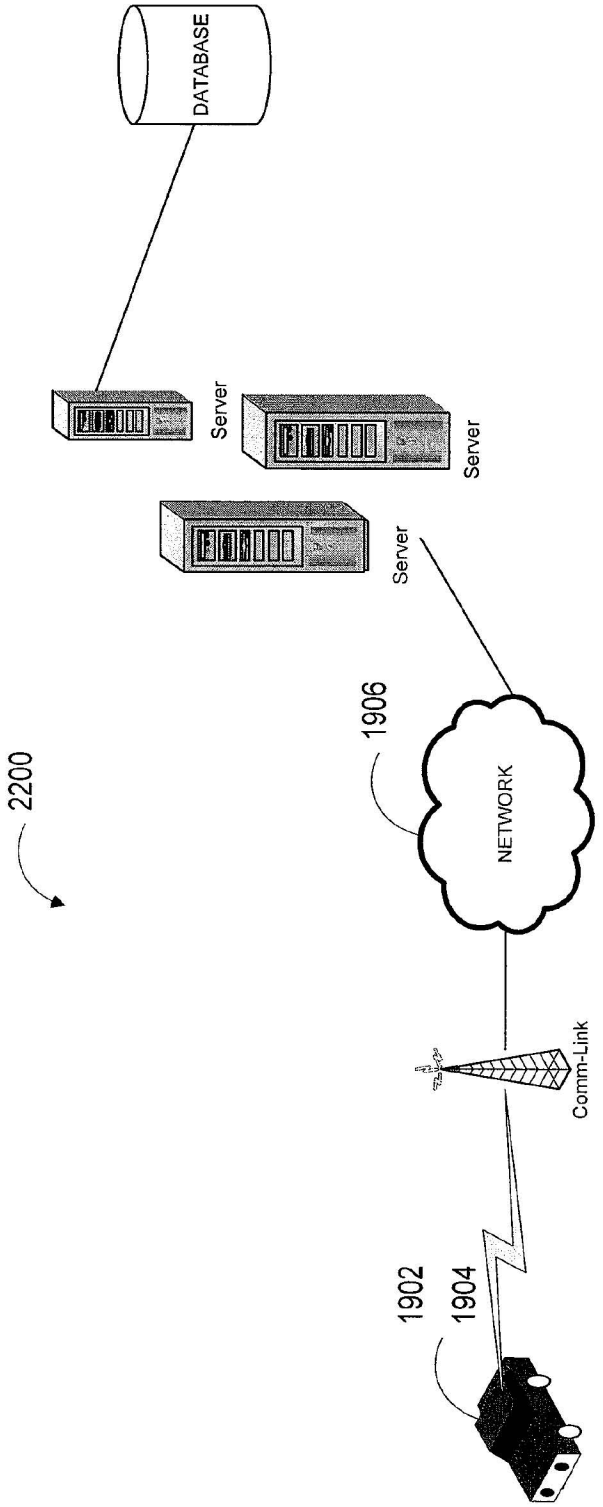
DATABASE
Server
Server
Server
1906
NETWORK
2200
Comm-Link
1902
1904

FIG. 22

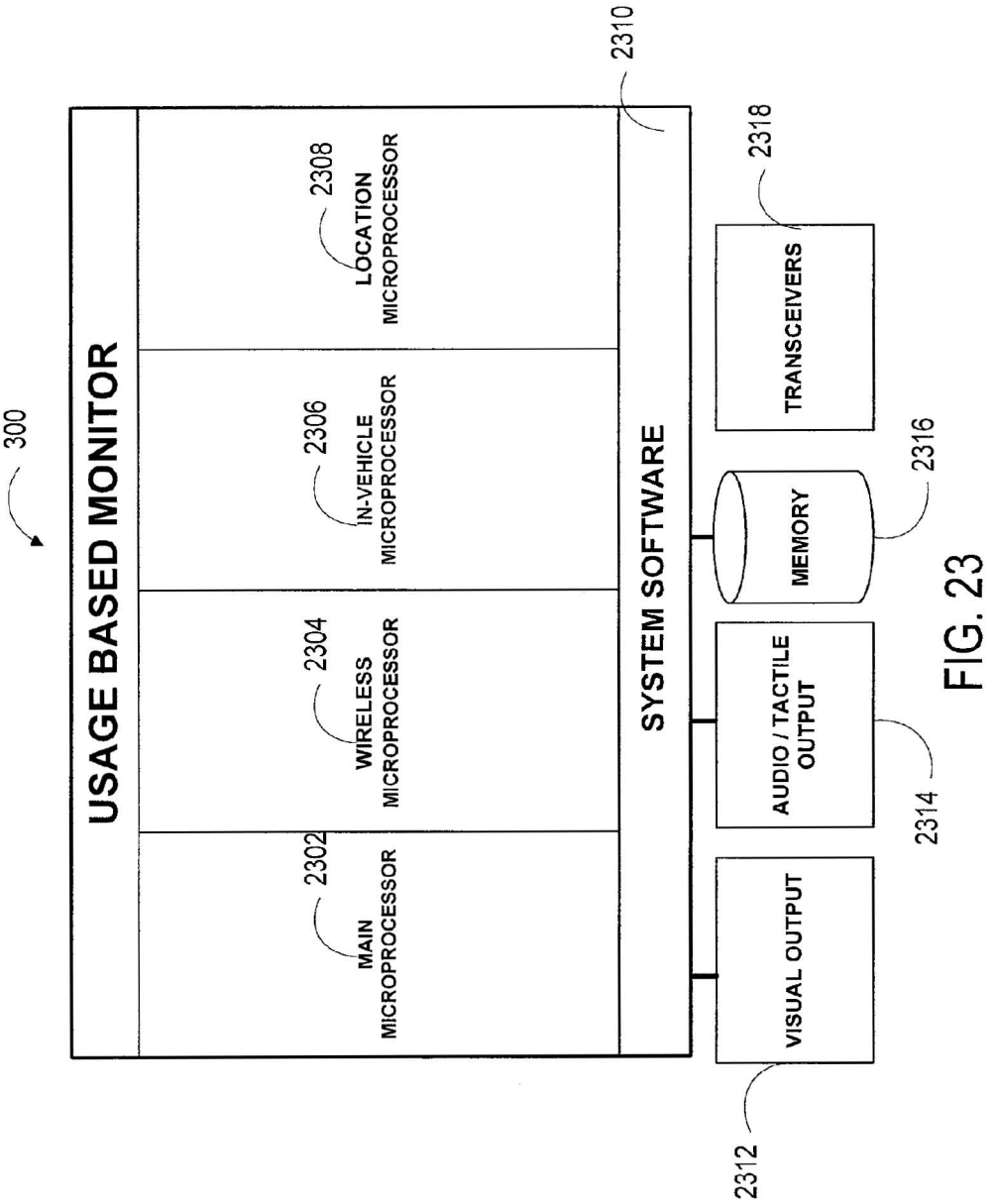
300
USAGE BASED MONITOR
2302
MAIN MICROPROCESSOR
2304
WIRELESS MICROPROCESSOR
2306
IN-VEHICLE MICROPROCESSOR
2308
LOCATION MICROPROCESSOR
2310
SYSTEM SOFTWARE
2312
VISUAL OUTPUT
2314
AUDIO / TACTILE OUTPUT
2316
MEMORY
2318
TRANSCEIVERS

FIG. 23

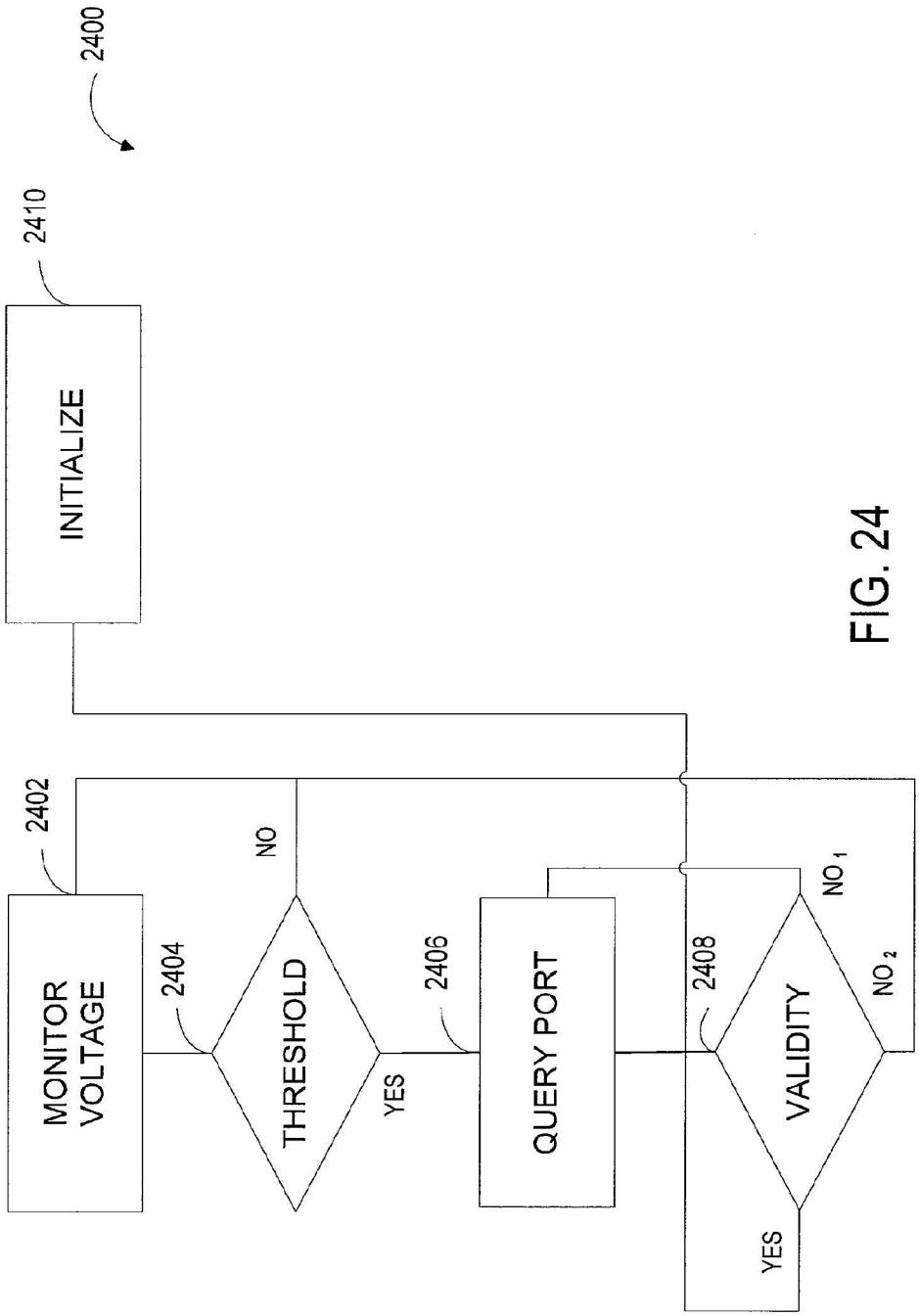
2400
2410
INITIALIZE
2402
MONITOR VOLTAGE
2404
THRESHOLD
NO
YES
2406
QUERY PORT
2408
VALIDITY
NO 1
NO 2
YES

FIG. 24

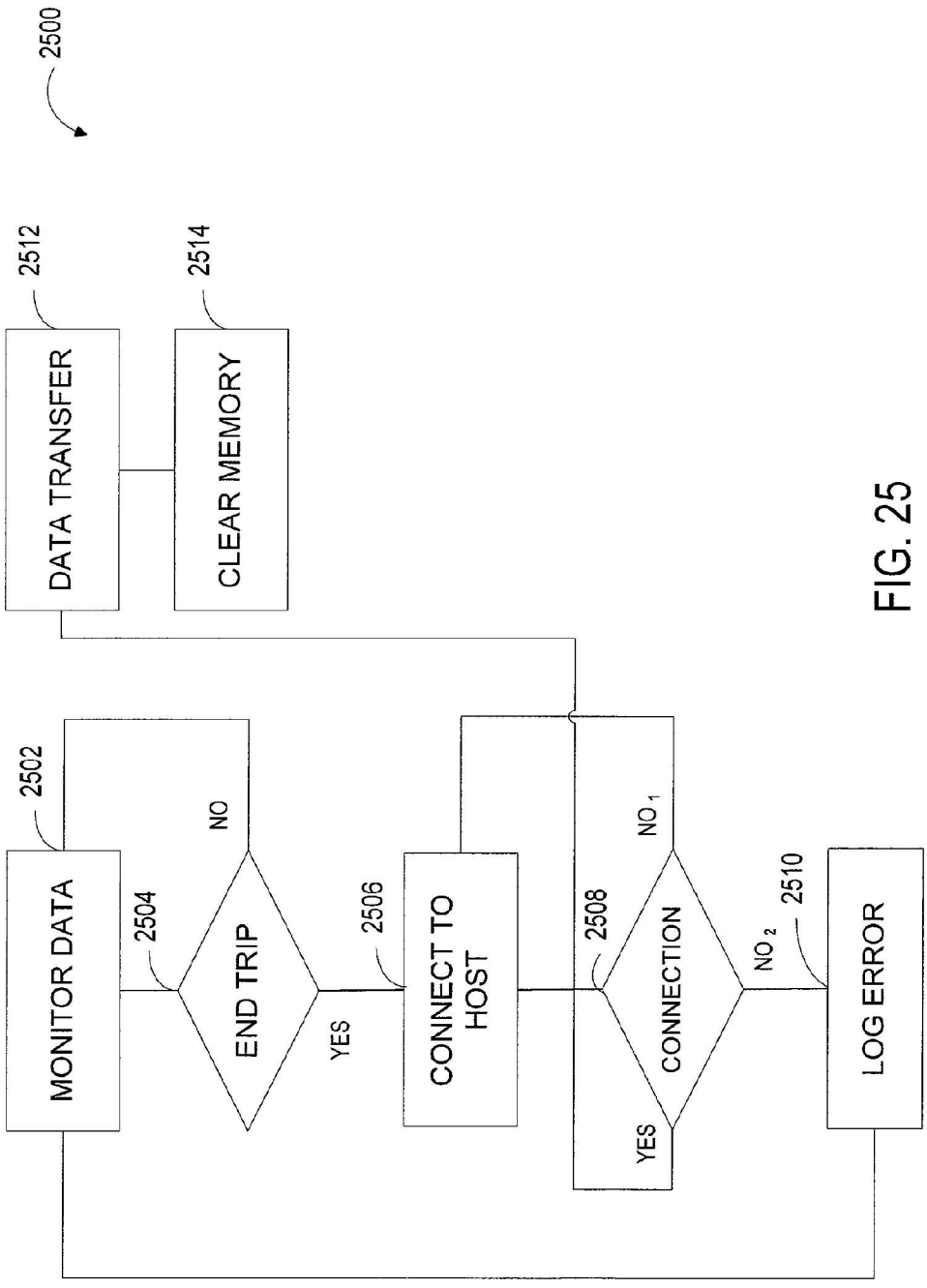
2500
2512
DATA TRANSFER
2514
CLEAR MEMORY
2502
MONITOR DATA
2504
END TRIP
NO
YES
2506
CONNECT TO HOST
2508
CONNECTION
NO 1
YES
NO 2
2510
LOG ERROR

FIG. 25

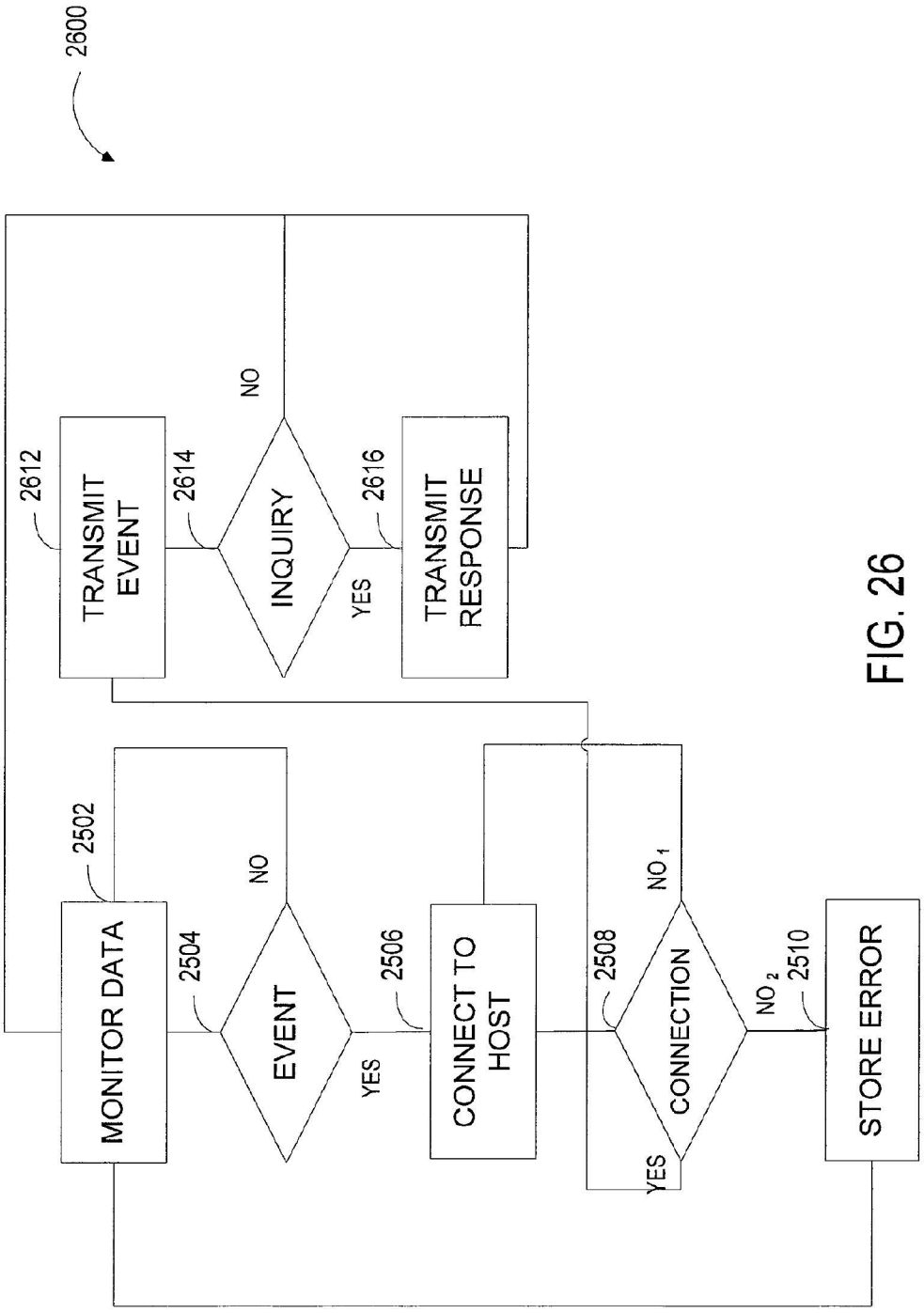
2600
2612
TRANSMIT EVENT
2614
INQUIRY
NO
YES
2616
TRANSMIT RESPONSE
2502
MONITOR DATA
2504
EVENT
NO
YES
2506
CONNECT TO HOST
2508
CONNECTION
NO 1
NO 2
2510
STORE ERROR
YES

FIG. 26

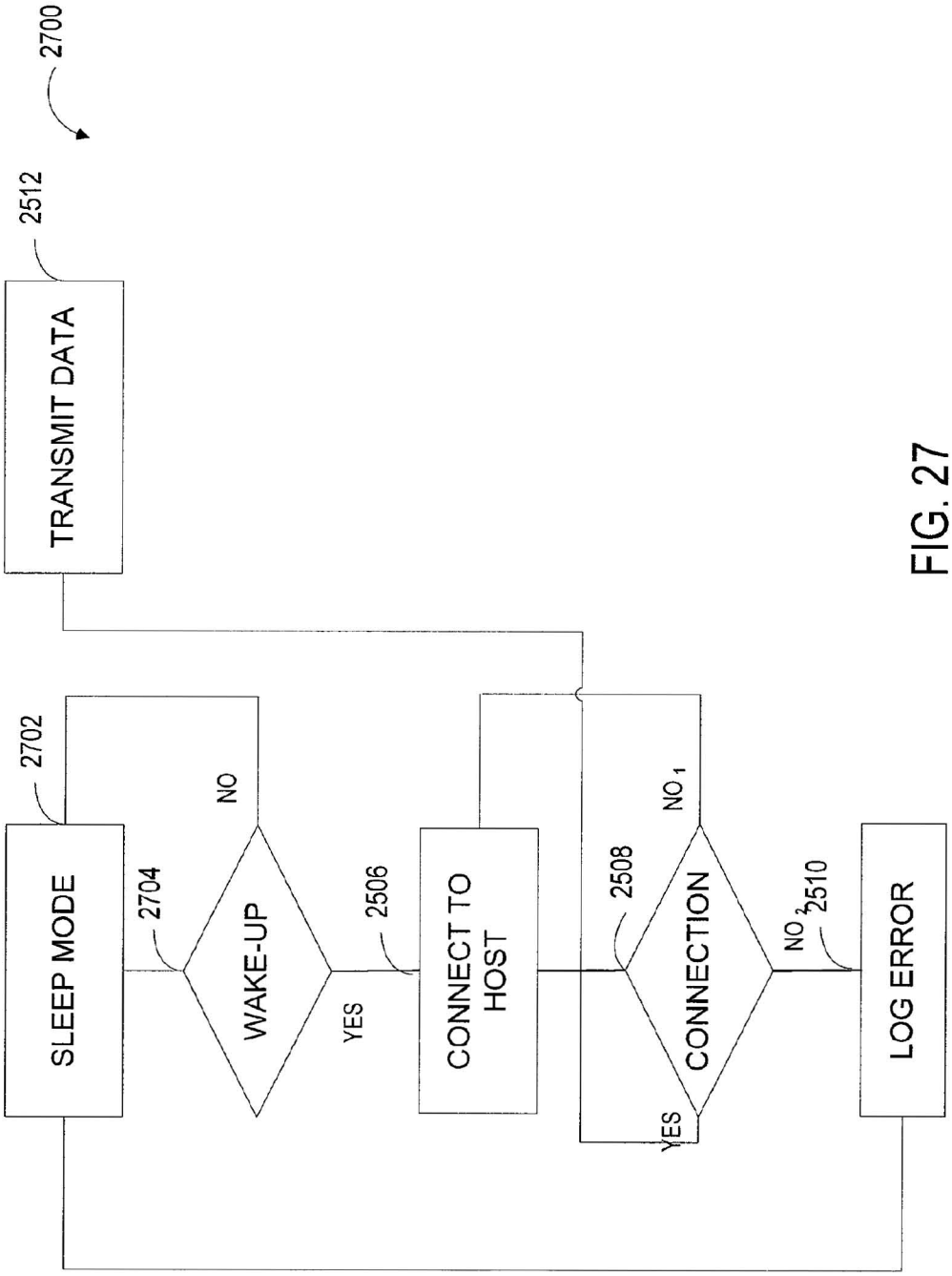
2700
2512
TRANSMIT DATA
2702
SLEEP MODE
2704
WAKE-UP
NO
YES
2506
CONNECT TO HOST
2508
CONNECTION
NO 1
YES
NO 2
2510
LOG ERROR

FIG. 27

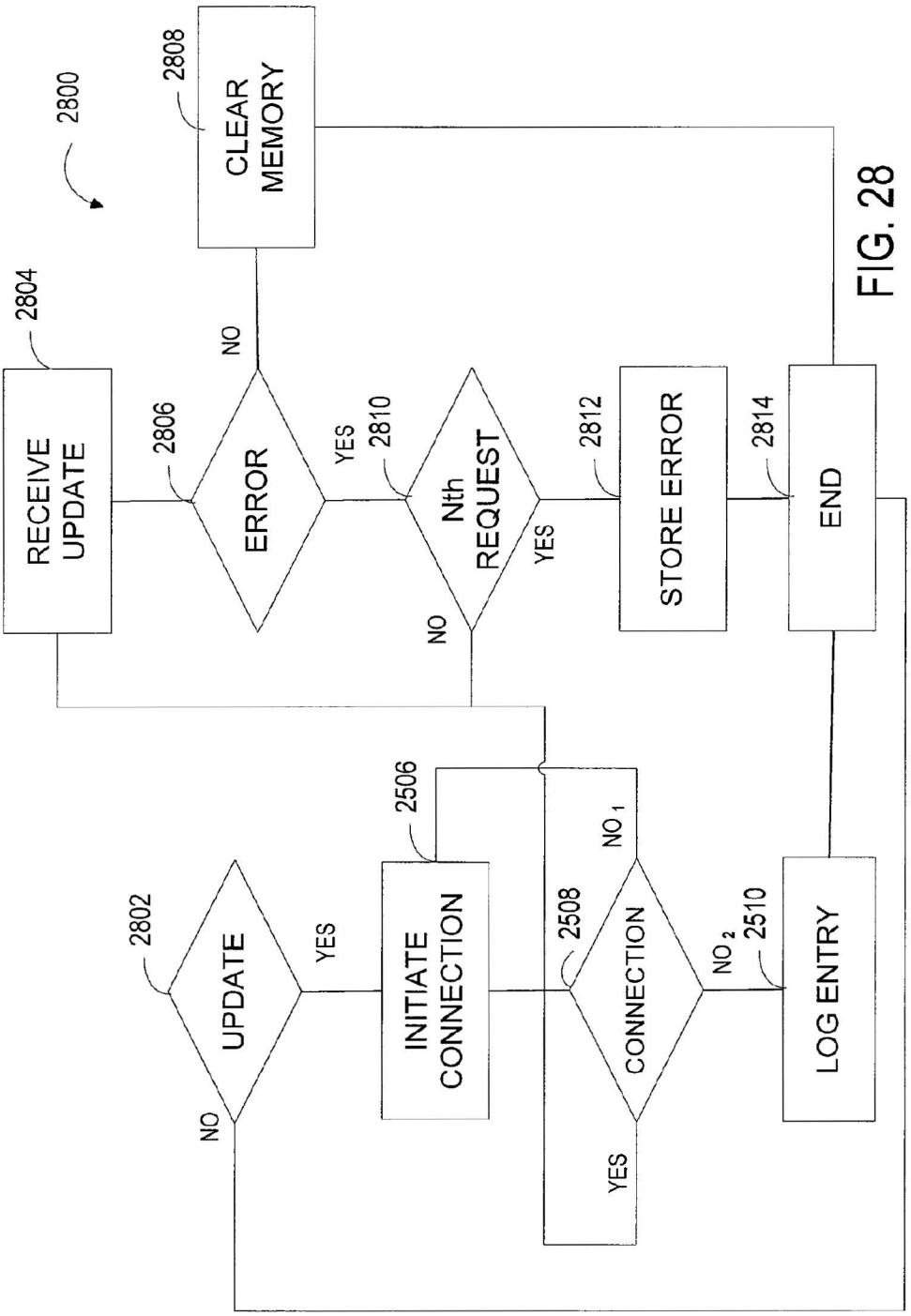
2800
2808
CLEAR MEMORY
2804
RECEIVE UPDATE
2806
ERROR
NO
YES
2810
Nth REQUEST
YES
NO
2812
STORE ERROR
2814
END
2802
UPDATE
YES
NO
2506
INITIATE CONNECTION
2508
CONNECTION
NO 1
YES
NO 2
2510
LOG ENTRY

FIG. 28

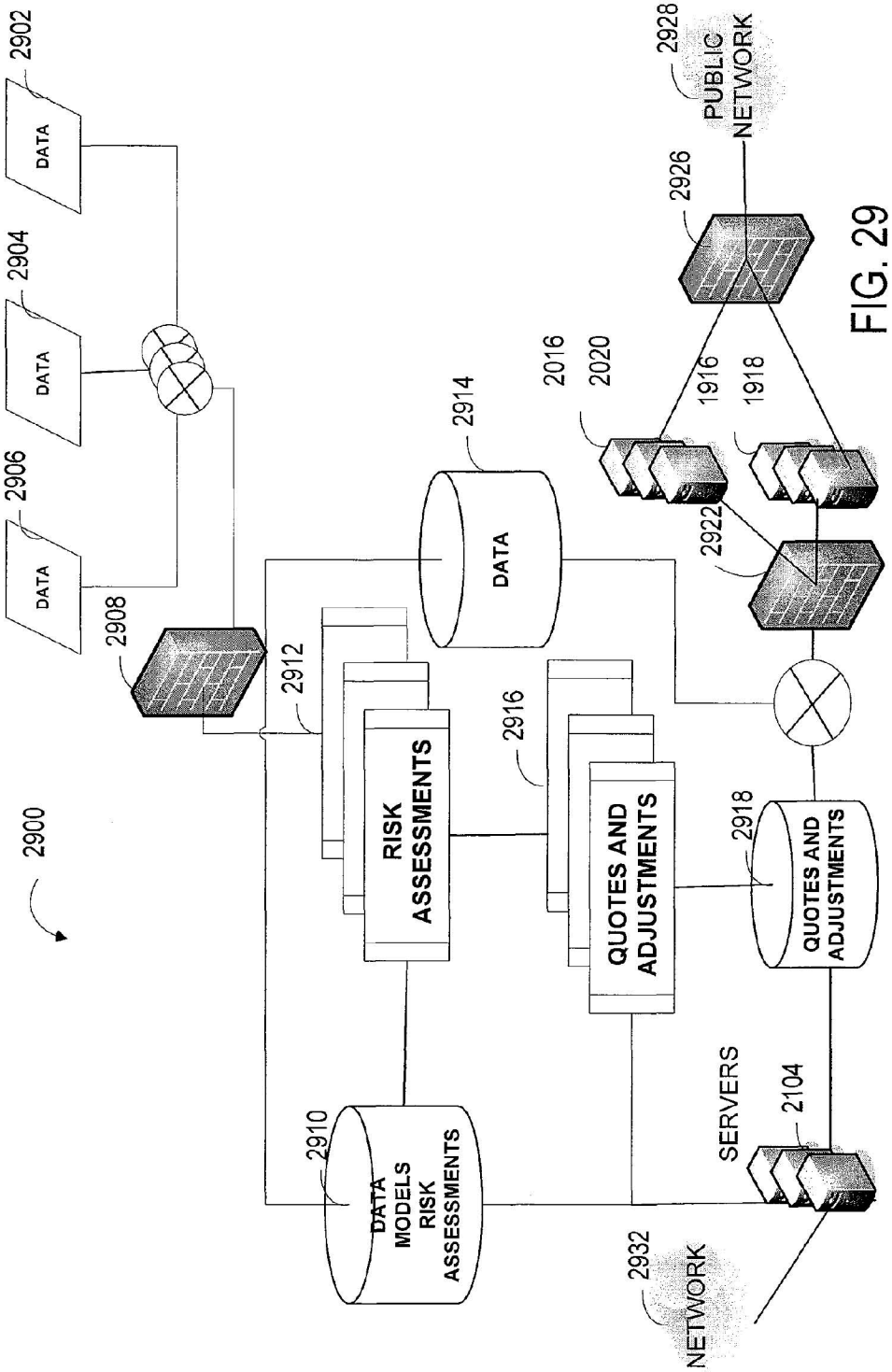
2900
2902
DATA
2904
DATA
2906
DATA
2908
2912
RISK ASSESSMENTS
2914
DATA
2916
QUOTES AND ADJUSTMENTS
2910
DATA MODELS RISK ASSESSMENTS
2928
PUBLIC NETWORK
2926
2016
2020
1916
1918
2922
2918
QUOTES AND ADJUSTMENTS
SERVERS
2104
2932
NETWORK

FIG. 29

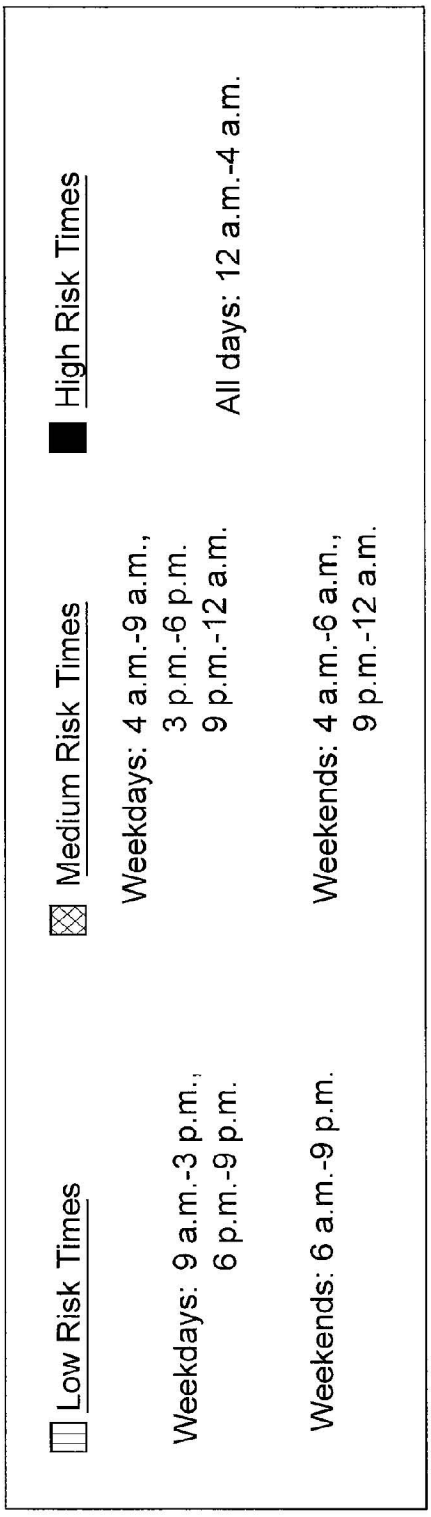
Low Risk Times
Weekdays: 9 a.m.-3 p.m.,
6 p.m.-9 p.m.
Weekends: 6 a.m.-9 p.m.
Medium Risk Times
Weekdays: 4 a.m.-9 a.m.,
3 p.m.-6 p.m.
9 p.m.-12 a.m.
Weekends: 4 a.m.-6 a.m.,
9 p.m.-12 a.m.
High Risk Times
All days: 12 a.m.-4 a.m.

FIG. 30

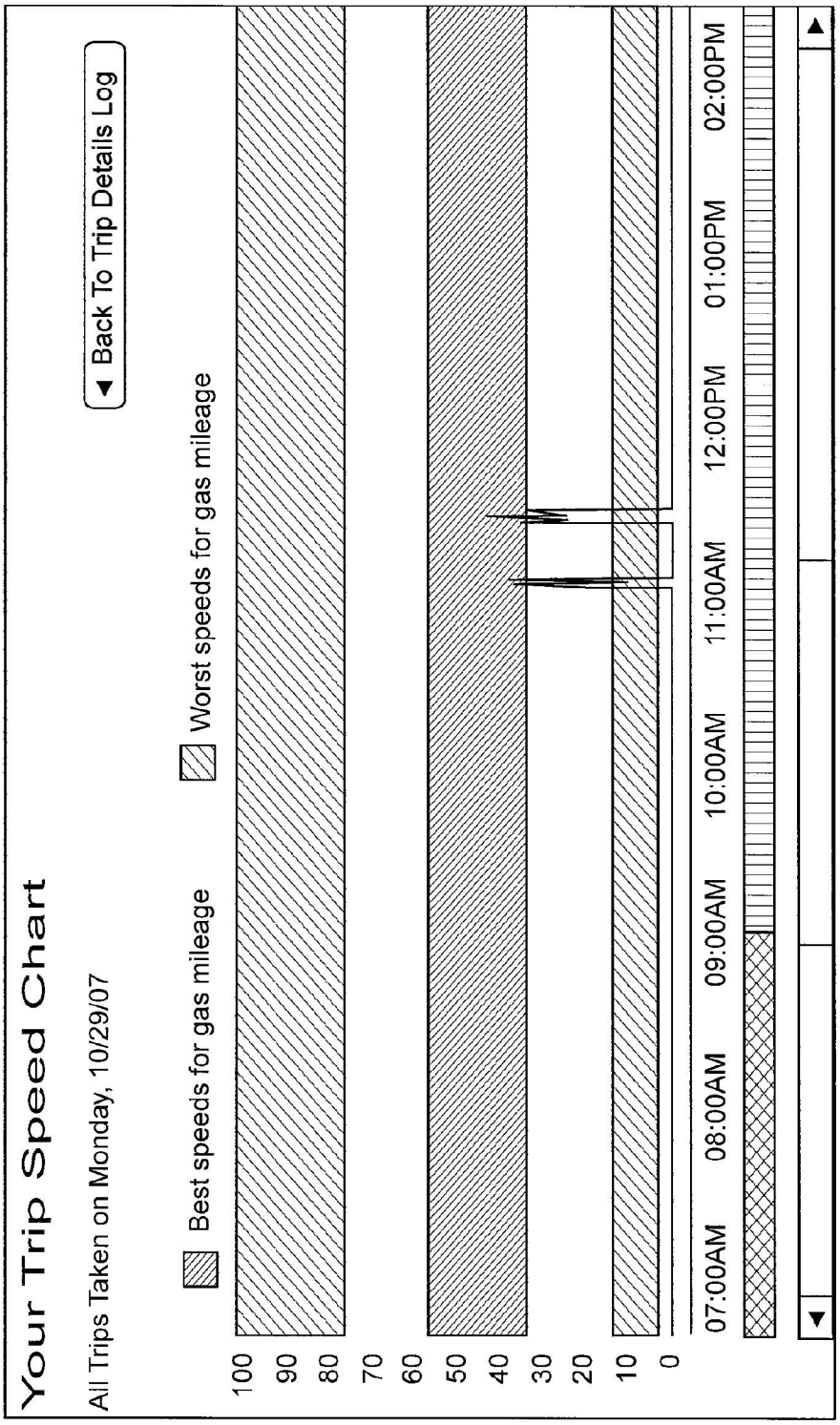
Your Trip Speed Chart
All Trips Taken on Monday, 10/29/07
Back To Trip Details Log
Best speeds for gas mileage
Worst speeds for gas mileage
100
90
80
70
60
50
40
30
20
10
0
07:00AM
08:00AM
09:00AM
10:00AM
11:00AM
12:00PM
01:00PM
02:00PM

FIG. 31

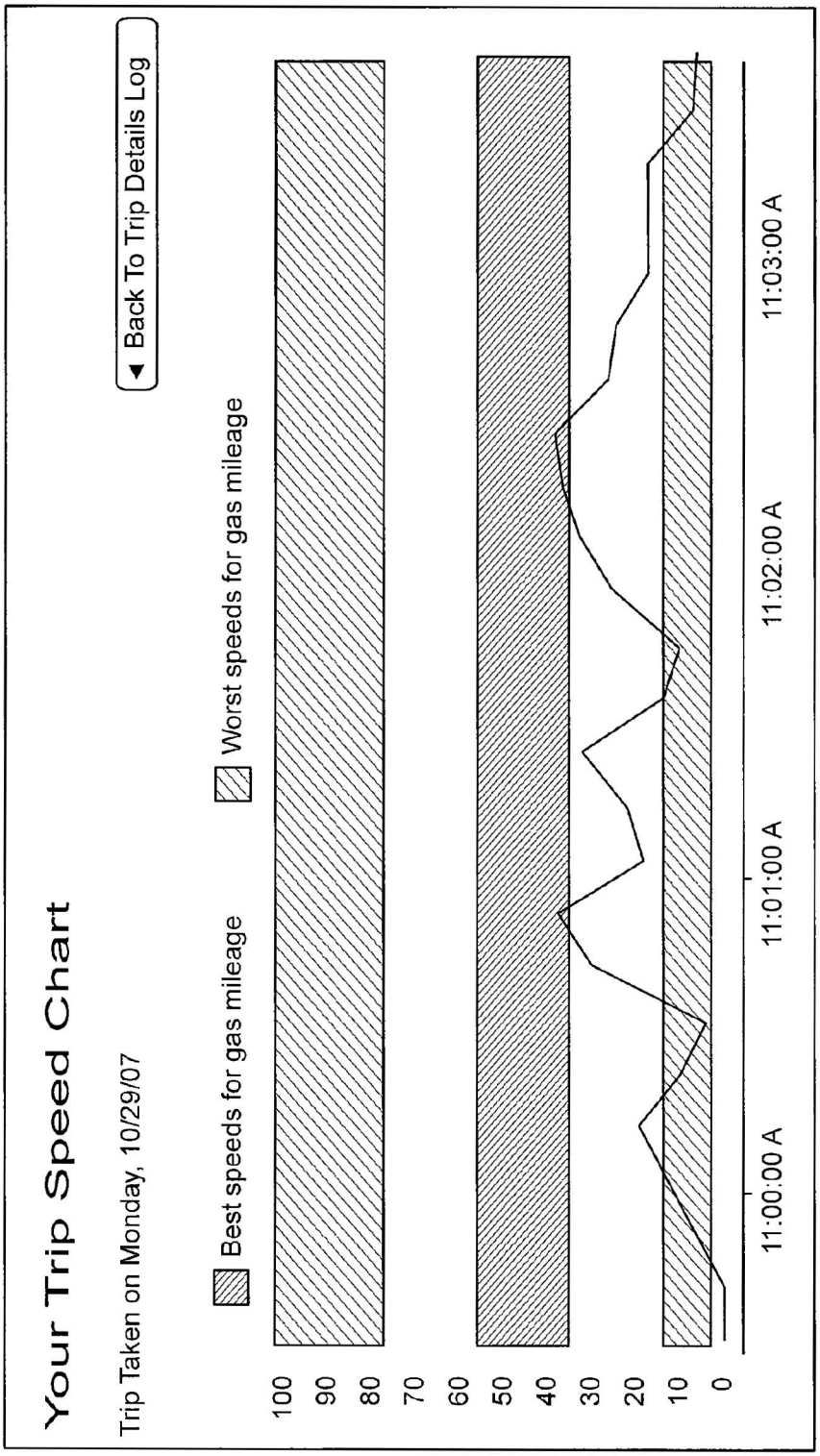
Your Trip Speed Chart
Trip Taken on Monday, 10/29/07
Back To Trip Details Log
Best speeds for gas mileage
Worst speeds for gas mileage
100
90
80
70
60
50
40
30
20
10
0
11:00:00 A
11:01:00 A
11:02:00 A
11:03:00 A

FIG. 32

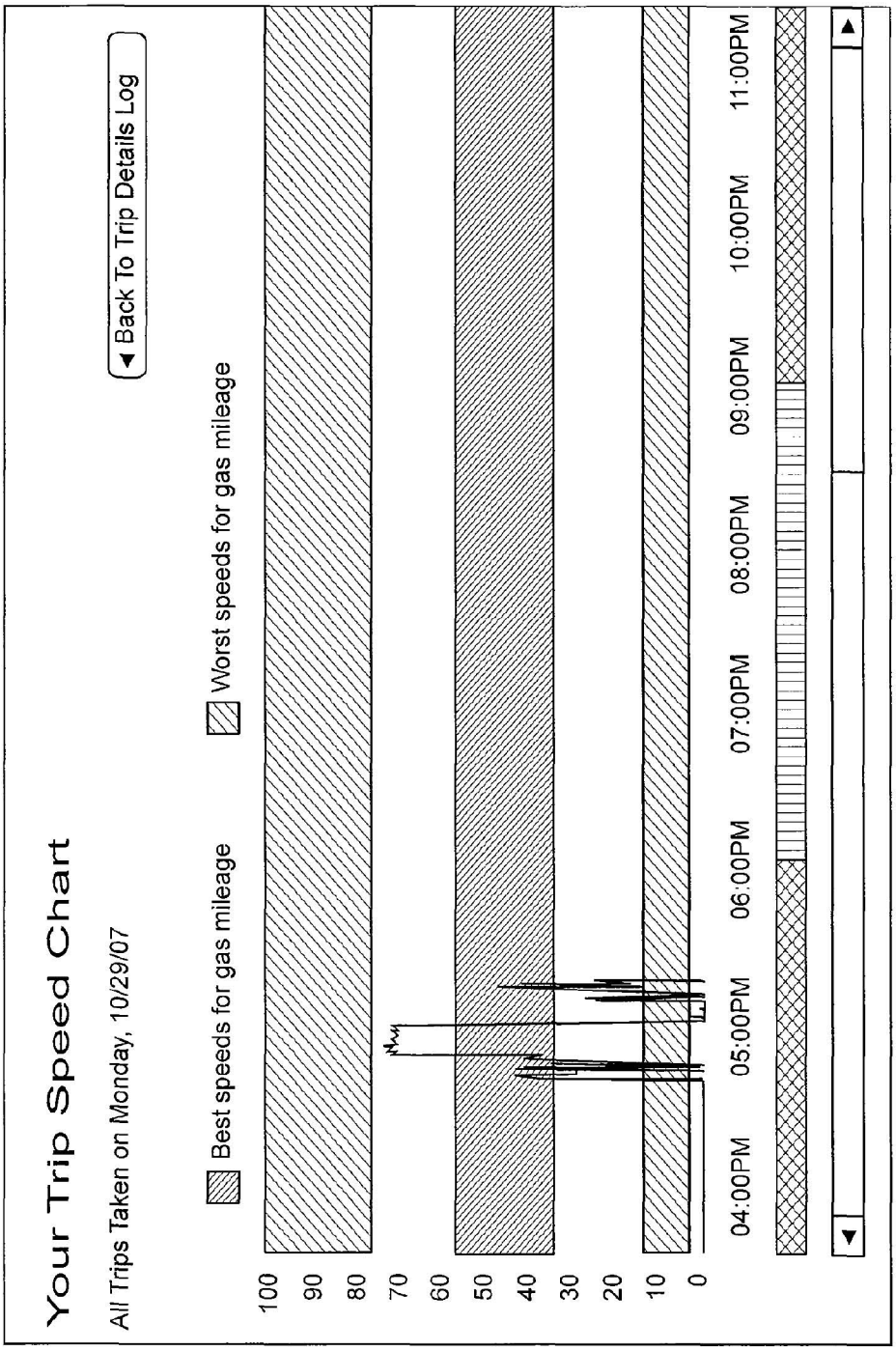
Your Trip Speed Chart
All Trips Taken on Monday, 10/29/07
◄ Back To Trip Details Log
Best speeds for gas mileage
Worst speeds for gas mileage
100
90
80
70
60
50
40
30
20
10
0
04:00PM
05:00PM
06:00PM
07:00PM
08:00PM
09:00PM
10:00PM
11:00PM

FIG. 33

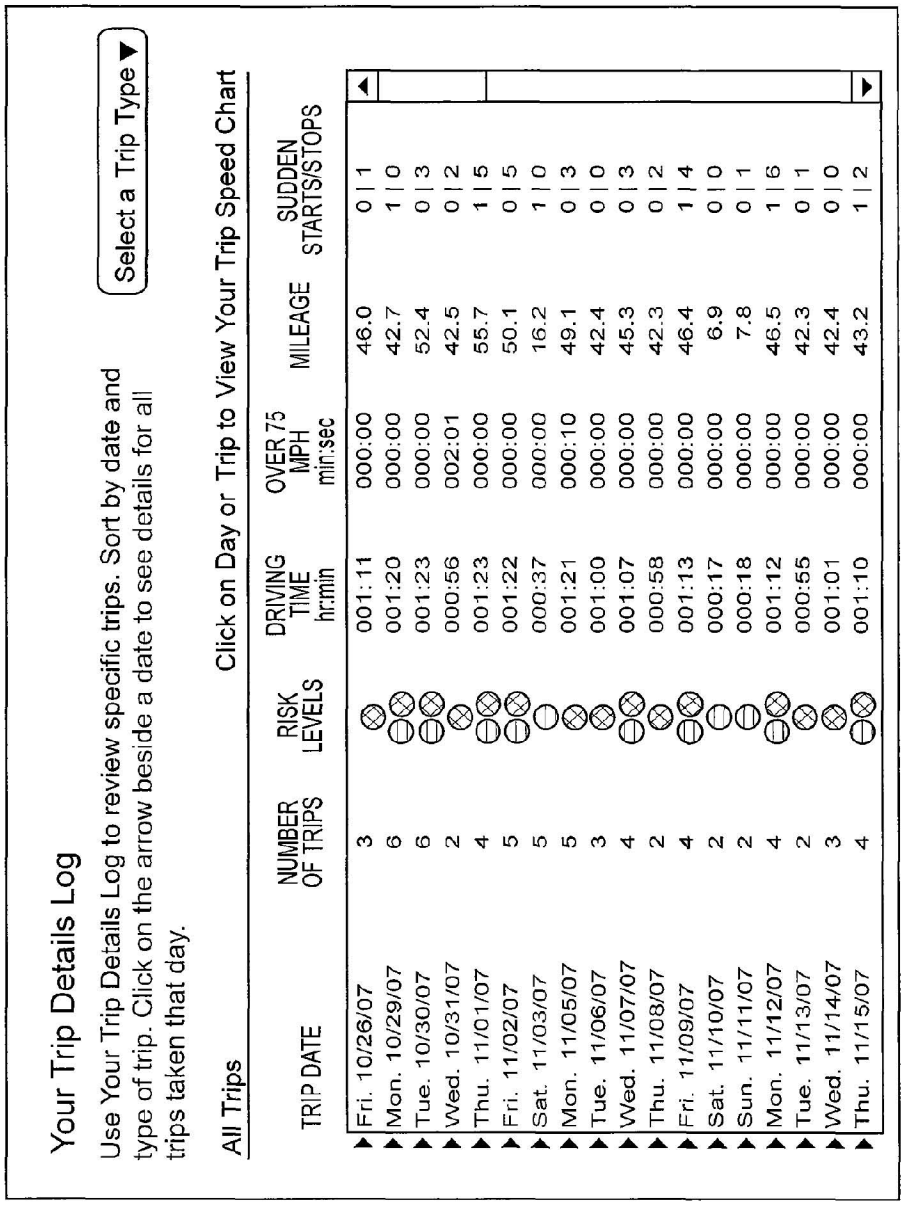
Your Trip Details Log
Use Your Trip Details Log to review specific trips. Sort by date and type of trip. Click on the arrow beside a date to see details for all trips taken that day.
Select a Trip Type
All Trips
Click on Day or Trip to View Your Trip Speed Chart
TRIP DATE
NUMBER OF TRIPS
RISK LEVELS
DRIVING TIME hr:min
OVER 75 MPH min:sec
MILEAGE
SUDDEN STARTS/STOPS
Fri. 10/26/07 3 001:11 000:00 46.0 0 | 1
Mon. 10/29/07 6 001:20 000:00 42.7 1 | 0
Tue. 10/30/07 6 001:23 000:00 52.4 0 | 3
Wed. 10/31/07 2 000:56 002:01 42.5 0 | 2
Thu. 11/01/07 4 001:23 000:00 55.7 1 | 5
Fri. 11/02/07 5 001:22 000:00 50.1 0 | 5
Sat. 11/03/07 5 000:37 000:00 16.2 1 | 0
Mon. 11/05/07 5 001:21 000:10 49.1 0 | 3
Tue. 11/06/07 3 001:00 000:00 42.4 0 | 0
Wed. 11/07/07 4 001:07 000:00 45.3 0 | 3
Thu. 11/08/07 2 000:58 000:00 42.3 0 | 2
Fri. 11/09/07 4 001:13 000:00 46.4 1 | 4
Sat. 11/10/07 2 000:17 000:00 6.9 0 | 0
Sun. 11/11/07 2 000:18 000:00 7.8 0 | 1
Mon. 11/12/07 4 001:12 000:00 46.5 1 | 6
Tue. 11/13/07 2 000:55 000:00 42.3 0 | 1
Wed. 11/14/07 3 001:01 000:00 42.4 0 | 0
Thu. 11/15/07 4 001:10 000:00 43.2 1 | 2

FIG. 34A

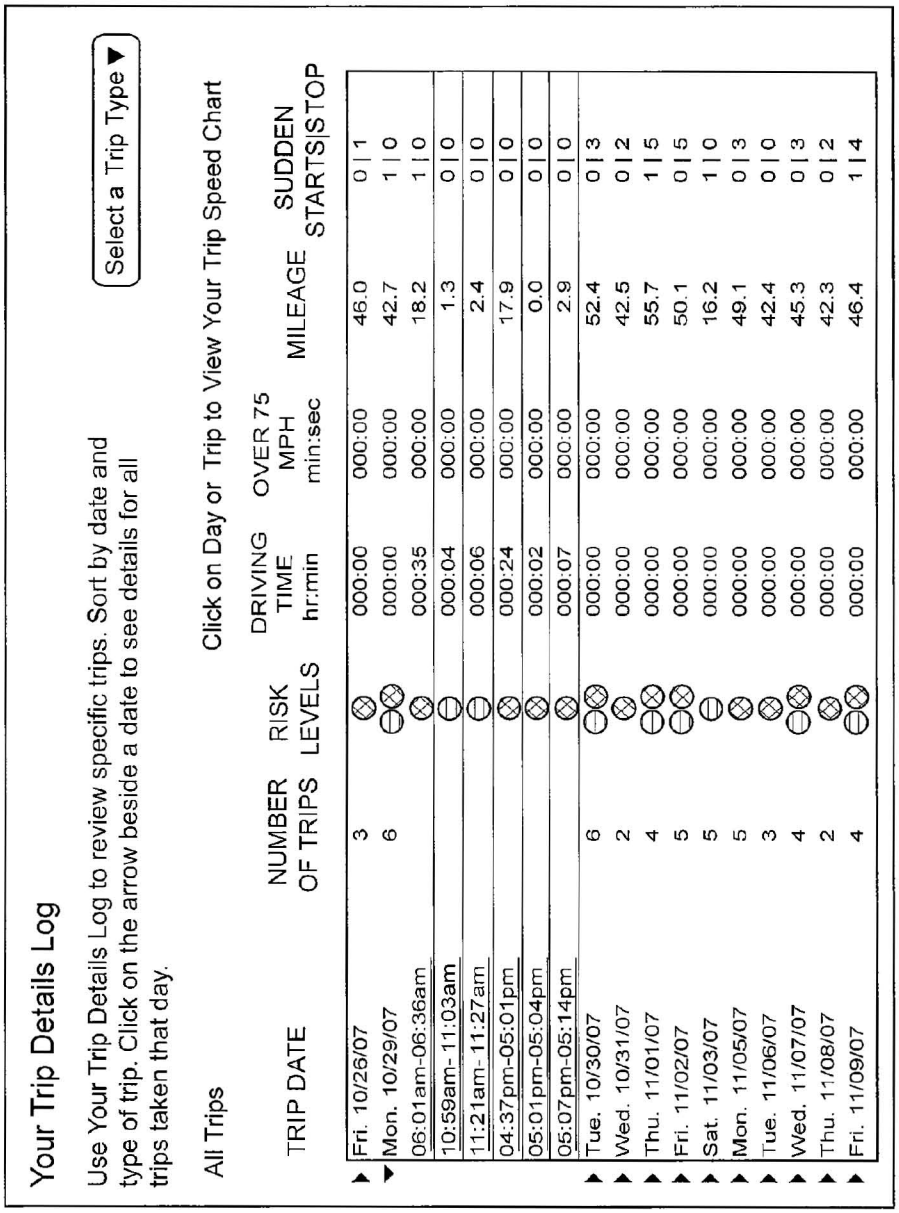
Your Trip Details Log
Use Your Trip Details Log to review specific trips. Sort by date and type of trip. Click on the arrow beside a date to see details for all trips taken that day.
Select a Trip Type
All Trips
Click on Day or Trip to View Your Trip Speed Chart
TRIP DATE
NUMBER OF TRIPS
RISK LEVELS
DRIVING TIME hr:min
OVER 75 MPH min:sec
MILEAGE
SUDDEN STARTS|STOP
Fri. 10/26/07 3 000:00 000:00 46.0 0 | 1
Mon. 10/29/07 6 000:00 000:00 42.7 1 | 0
06:01am-06:36am 000:35 000:00 18.2 1 | 0
10:59am-11:03am 000:04 000:00 1.3 0 | 0
11:21am-11:27am 000:06 000:00 2.4 0 | 0
04:37pm-05:01pm 000:24 000:00 17.9 0 | 0
05:01pm-05:04pm 000:02 000:00 0.0 0 | 0
05:07pm-05:14pm 000:07 000:00 2.9 0 | 0
Tue. 10/30/07 6 000:00 000:00 52.4 0 | 3
Wed. 10/31/07 2 000:00 000:00 42.5 0 | 2
Thu. 11/01/07 4 000:00 000:00 55.7 1 | 5
Fri. 11/02/07 5 000:00 000:00 50.1 0 | 5
Sat. 11/03/07 5 000:00 000:00 16.2 1 | 0
Mon. 11/05/07 5 000:00 000:00 49.1 0 | 3
Tue. 11/06/07 3 000:00 000:00 42.4 0 | 0
Wed. 11/07/07 4 000:00 000:00 45.3 0 | 3
Thu. 11/08/07 2 000:00 000:00 42.3 0 | 2
Fri. 11/09/07 4 000:00 000:00 46.4 1 | 4

FIG. 34B

U,890141042114728572O3,2008/04/01,16:16:00
H,2008/04/01,16:09:01,
D,1.035,6
D,1.005,8
D,1.000,10
D,1.005,12
D,0.990,13
D,1.005,14
D,1.025,19
D,0.975,22
D,1.000,25
D,1.000,28
D,1.000,29
D,0.995,29
D,1.000,29
D,1.005,26
D,1.005,21
D,1.000,17
D,0.985,17
D,1.045,21
D,0.965,25
D,1.015,29
D,0.985,33
D,1.005,34
D,0.990,34
D,1.005,34
D,1.000,31
D,1.000,27
D,1.015,21
D,0.985,16
D,1.010,11
D,0.985,7
D,1.005,9
D,1.015,12
D,0.985,17
D,1.065,22
D,0.965,28
D,1.005,33
D,0.970,36
D,1.000,39
D,0.990,41
D,1.005,41
D,1.000,41
D,1.005,40
D,0.990,41
D,1.025,41
D,0.980,42
D,1.005,41
D,1.000,38
D,0.990,36
D,1.000,35
D,1.005,33
D,1.000,28
D,1.015,26
D,0.980,26
D,1.000,25
D,1.000,25
D,1.005,25
D,0.995,25
D,1.000,26
D,1.000,27
D,1.005,27
D,1.005,27
D,1.000,26
D,1.015,26
D,0.975,25
D,1.005,24
D,1.015,23
D,1.000,21
D,1.005,19
D,1.000,18
D,1.005,19
D,0.970,21
D,1.010,25
D,0.990,28
D,1.005,32
D,1.015,34
D,0.995,34
D,1.000,34
D,1.005,31
D,0.985,27
D,1.015,23
D,1.005,19
D,0.975,15
D,1.005,11
D,1.005,5
D,0.990,1
D,1.005,0
D,1.000,0
D,1.010,0
D,0.990,5
D,1.010,14
D,0.990,16
D,1.020,18
D,1.015,20
D,0.965,22
D,1.000,25
D,1.025,30
D,0.970,35
D,1.005,39
D,0.995,42
D,1.005,43
D,1.000,43
D,1.000,43
D,1.050,40
D,0.950,37
D,1.005,32
D,0.990,26
D,1.000,19
D,1.070,13
D,0.935,12
D,0.995,15
D,1.005,19
D,1.005,23
D,1.010,27
D,1.015,33
D,0.965,37
D,1.005,41
D,1.005,43
D,0.990,46
D,1.005,48
D,1.000,50
D,1.000,52
D,0.995,55
D,1.010,58
D,0.990,59
D,1.005,60
D,1.005,60
D,1.010,61
D,0.980,61
D,1.000,61
D,1.005,61
D,1.000,61
D,1.000,61
D,0.995,60
D,1.000,60
D,1.005,59
D,1.005,59
D,0.990,59
D,1.005,58
D,1.000,58
D,0.995,58
D,1.000,58
D,1.005,58
D,0.995,58
D,1.000,58
D,1.000,58
D,1.000,58
D,1.005,58
D,1.020,57
D,0.980,57
D,0.995,59
D,1.005,61
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X,1,0102A,7203,006f,0001

FIG. 35

VEHICLE MONITORING SYSTEM

PRIORITY CLAIM

This application is a continuation-in-part application of U.S. Ser. No. 10/764,076, filed Jan. 23, 2004, which is a continuation-in-part application of U.S. Ser. No. 09/571,650, filed May 15, 2000, now U.S. Pat. No. 6,868,386, which is a continuation-in-part of U.S. Ser. No. 09/135,034, filed Aug. 17, 1998, now U.S. Pat. No. 6,064,970, which is a continuation of U.S. Ser. No. 08/592,958, filed Jan. 29, 1996, now U.S. Pat. No. 5,797,134.

BACKGROUND OF THE INVENTION

1. Technical Field

This disclosure relates to data acquisitions, and particularly to a system that acquires data related to evaluating risk.

2. Related Art

Methods that determine costs of insurance may gather data from personal interviews and legacy sources. The data may be used to classify applicants into actuarial classes that may be associated with insurance rates.

Some data used to classify risk is not verified and has little relevance to measuring risk. Systems may accumulate and analyze significant amounts of data and yet discover that the data does not accurately predict losses. The data may not be validated, may be outdated, and may not support new or dynamic risk assessments.

SUMMARY

A data logging device tracks the operation of a vehicle and/or operator behavior. The device includes a storage device (which may be removable or portable) having a first memory portion that may be read from and may be written to in a vehicle and a second memory portion that may be read from and may be written to in a vehicle. The second memory portion may retain data attributes associated with the data stored in the first memory portion. A processor reads data from an automotive bus that transfers data from vehicle sensors to other automotive components. The processor writes data to the first memory portion and the second memory portion that reflect a level of safety. A communication device links the data logging device to a network of computers. The communication device may be accessible through software that may be retained on a computer readable media. The software allows a user to access files related to a level of risk or safety and other software that may be related to those files.

Other systems, methods, features, and advantages will be, or will become, apparent to one with skill in the art upon examination of the following Figures and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the invention, and be protected by the following claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The system may be better understood with reference to the following drawings and description. The components in the Figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. Moreover, in the Figures, like referenced numerals designate corresponding parts throughout the different views.

FIG. **1** describes a data capture method used in a claim process.

FIG. **2** is a block diagram of a network that includes a response center and a data handling center.

FIG. **3** is an exemplary vehicle with a monitoring device.

FIG. **4** is an exemplary vehicle architecture that includes a vehicle processor or onboard computer interfaced to a monitoring device that communicates selective data to a remote destination.

FIG. **5** is a data flow process illustrating communication through an Internet access.

FIG. **6** is an exemplary underwriting and rating method.

FIG. **7** is an exemplary underwriting and rating method.

FIG. **8** is an interface displaying vehicle data that includes exemplary information that may relate to a cost of insurance.

FIG. **9** is a second interface displaying vehicle data that includes exemplary information that may relate to a cost of insurance.

FIG. **10** is a third interface displaying vehicle data that includes exemplary information that may relate to a cost of insurance.

FIG. **11** is an exemplary Web page displaying in-vehicle data that includes exemplary information that may relate to a cost of insurance and an interface enabling "what-if" evaluations.

FIG. **12** is an exemplary Web page displaying trip information and relationships with other vehicles.

FIG. **13** is an exemplary Web page that includes speed information.

FIG. **14** is an exemplary Web page that includes trip information by date.

FIG. **15** is an exemplary Web page that includes trip log data.

FIG. **16** is another exemplary Web page that includes trip log data.

FIG. **17** is another exemplary Web page that includes data identifying an exemplary installation, disconnection, and data transfer events.

FIG. **18** is a block diagram of an exemplary device that monitors vehicle data.

FIG. **19** is a network in communication with a vehicle monitoring device.

FIG. **20** is a network in communication with remote clients.

FIG. **21** is a backend of a network based risk management system.

FIG. **22** is a risk management system communicating with a vehicle monitoring device.

FIG. **23** is a block diagram of an in-vehicle device that may communicate with an in-vehicle local processor or controller.

FIG. **24** is an initialization process.

FIG. **25** is a process in which a vehicle monitoring device communicates through a network.

FIG. **26** is a process where a vehicle monitoring device communicates in response to an event.

FIG. **27** is a power management process.

FIG. **28** is a software update process.

FIG. **29** is an alternative backend of a network based risk management device.

FIG. **30** is a graphical interface summarizing exemplary periods of risk.

FIG. **31** is a graphical user interface displaying a summary.

FIG. **32** is a second graphical user interface displaying a summary.

FIG. **33** is a third graphical user interface displaying a summary at a higher resolution.

FIG. **34** are multiple graphical user interfaces displaying selected trip details.

FIG. **35** is a sample data file generated by a vehicle monitoring device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following terms may be used in this detailed description.

Internet refers to interconnected (public and/or private) networks that may be linked together by protocols (such as TCP/IP and HTTP) to form a globally accessible distributed network. While the term Internet refers to what is currently known (e.g., a publicly accessible distributed network), it is also encompasses variations which may be made in the future, including new protocols or any changes or additions to existing protocols.

World Wide Web ("Web") refers to (i) a distributed collection of user-viewable or accessible documents (that may be referred to as Web documents or Web pages) or objects that may be accessible via a publicly accessible distributed network like the Internet, and/or (ii) the client and server software components which provide user access to documents and objects using communication protocols. A protocol that may be used to locate, deliver, or acquire Web documents or objects through HTTP (or other protocols), and the Web pages may be encoded using HTML, tags, and/or scripts. The terms "Web" and "World Wide Web" encompass other languages and transport protocols including or in addition to HTML and HTTP that may include security features, server-side, and/or client-side scripting.

Web Site refers to a system that serves content over a network using the protocols of the World Wide Web. A Web site may correspond to an Internet domain name, such as "progressive.com," and may serve content associated or provided by an organization. The term may encompass (i) the hardware/software server components that serve objects and/or content over a network, and/or (ii) the "backend" hardware/software components, including any standard, non-standard or specialized components, that may interact with the server components that provide services for Web site users.

The drawings illustrate exemplary embodiments and are not intended to limit the subject matter claimed. Some of the figures show systems and/or methods that monitor, record and/or communicate risk-based or insurance-related data. The data may be used to quantify risk, determine a level of risk, or determine a rating or a cost of insurance. The metrics can be used to monitor the operation and/or location of a machine, or measure the relative safety of its operation. The device may monitor a vehicle or other machine through an interface or may be a unitary part of the vehicle or machine. It may generate data that may determine the cost to protect against a risk of loss, such as damage or injury to the vehicle or machine itself, to the operator of or passengers in the vehicle or machine, or to other vehicles or property. The data may be processed to determine an insurance cost that may be based on statistical analysis, models, comparisons, or other evaluations.

For example, based on operational information or data, an insurer may make predictions about how and/or where a machine may be operated. The system or method may measure or monitor machine operation. Where the machine is a vehicle, a user may monitor and/or adjust his/her insurance costs by adjusting his/her driving behavior. The data may establish a safe driving record a lower risk of being subject to a claim. Such monitoring may generate insurance scores, safety scores, rating factors, and/or affect current, retrospective or prospective costs of insurance. Data that may be monitored and recorded include, for example, any one or more of the following:

1. Actual miles driven;
2. Types of roads driven on (high risk vs. low risk); and,
3. Safe or unsafe operation of the vehicle by the vehicle user through:
   A. speeds driven,
   B. safety equipment used, such as seat belt and turn signals,
   C. time of day driven
   D. rate of acceleration,
   E. rate of braking (deceleration),
   F. observation of traffic signs (signals);
   G. traffic conditions (high congestion vs. low congestion); and/or
   H. road conditions
   I. acceleration events;
   J. deceleration events; and/or
   K. force/lateral acceleration or characteristics that indicate a hard turning maneuver.
4. Driver identification
5. Temporal characteristics (e.g., period of time an ignition is active or internal power bus is sustained).

FIG. **3** shows an exemplary motor vehicle. An on-board portable mobile device **300** (the device **300**) monitors and records output of diverse sensors and operator actions to assess a level of risk or determine a price or cost of insurance. One, two or more operating sensors (e.g., physically or wirelessly linked to a physical or virtual vehicle data bus) within the vehicle may monitor a variety of raw data elements. The data may be transmitted to in-vehicle OEM (Original Equipment Manufacturer) processors that manage powertrain, safety, entertainment, comfort, or ancillary functions. Such data elements may be communicated directly to the device **300** (e.g., from the sensors), or from the in-vehicle OEM or out-of-vehicle processor(s) through a physical or wireless connection that may interface an in-vehicle data bus **304**. The in-vehicle data bus **304** may be connected to the on-board device **300** through a virtual or physical connector, such as, for example, a vehicle connector compliant with SAE-1962 or On Board Diagnostic connector (e.g., ODBI, ODBII, ODBIII, etc.) and the protocols they convey.

In some systems, in-vehicle or network communication occurs through a wireless protocol or network. Transceivers may provide short and/or long range radio, optical link, or operational links that may not require a physical communication path to receive or transmit data. The communication protocol or network may provide an interoperable communication link with other in-vehicle or external applications and/or devices. In some systems, a wireless network may provide connectivity when the wireless network or a wireless service provider indicates a channel capacity or excess channel capacity to transfer some or all of the desired data to a destination. A device push may load the desired data to a destination and may keep the connection open to allow the device **300** to continue sending the desired data or respond to external requests (e.g., queries). A device **300** may pull data to the device **300** too, in which a connection may or may not remain open.

In some systems, the transceivers may be compliant with a low-cost, low-power, wireless mesh network, such as Zigbee (e.g., 868 MHz in Europe, 915 MHz in countries such as USA and Australia, and 2.4 GHz in other jurisdictions), or a short range protocol, such as Bluetooth®. The Bluetooth word mark and logos may be owned by Bluetooth SIG, Inc. Bluetooth may encompass the wireless specification defined by IEEE 802.15, 802.15.4 (TG4), 802.15.3 (TG3), or other standards. The standard may include multiple sub-layers including an RF layer that may be based on an antenna power range starting at about 0 dBm up to a range of about 20 dBm in the

abut 2.4 GHz band and having a link range from about 10 centimeters to about 10 meters. It may include a baseband layer that establishes a physical link between devices forming a piconet (e.g., a network of devices that may be connected in an ad hoc fashion). It may include a link manager that sets up the link between Bluetooth devices. Other functions of the link manager may include security, negotiation of baseband packet sizes, power mode and duty cycle control of the communication portion of the device, and the connection states of a compliant device in a piconet. Also, it may include a logical link control and adaptation protocol (L2CAP) that provides the upper layer protocols with connectionless and connection-oriented services.

An optional driver input device **308** may be operatively connected to the device **300** through a virtual or physical connector (e.g., a cable **302** and **307**). The device **300** may receive power through the vehicle battery **310**, a remote generator, an alternator, fuel cell, an internal source (e.g., battery or elements that temporarily store charge) or other sources, such as a solar based system (not shown). In some systems, a power source may be part of the device **300** even when a primary power is drawn from the machine (vehicle). For instance, an internal battery may source power to a timing device, such as internal clock, device memory and/or allow the device to record connection and disconnection events. In other systems, the device may draw power from the vehicle or a network it interfaces.

A second receiver or transceiver in the device **300** may track location through navigation signals that may comprise a GPS (global positioning system) protocol, a differential GPS protocol, a trilateraleralism of external encoded signals (e.g., may be in the radio frequency range), protocols that monitor continuously transmitted coded signals, or other locating protocols or systems **312** (referred to as the location protocols). In FIG. **3**, a cellular or wireless protocol, a wireless or cellular telephone, a radio, a satellite, or other wireless communication system may link the device to a privately accessible or publicly accessible distributed network or directly to an intermediate surrogate or central control station. The communication link may comprise Mobile-FI or a low-cost, always-on, mobile broadband wireless network that may have IP (Internet Protocol) roaming & handoff (at more than about 1 Mbit/s), MAC and PHY with IP and adaptive antennas, full mobility or substantial mobility up to vehicle speeds of about 88.7-162 km/h or higher (e.g., 250 km/h), operate in frequency bands (below 3.5 GHz), and/or utilize a packet architecture and have a low latency. In some applications, the device **300** may be Ultra-wideband compliant and may transmit information by generating radio energy at specific time instants and occupying large bandwidth, thus enabling a pulse-position or time-modulation communications. This protocol may be different from other wireless protocols that transmit information by varying the power level, frequency, and/or phase of a sinusoidal wave. In other applications, the system may be complaint with WiMax or IEEE 802.16a or may have a frequency band within a range of about 2 to about 11 GHz, a range of about 31 miles, and a data transfer rate of about 70 Mbps. In other applications, the device **300** may be compliant with a Wi-Fi protocols or multiple protocols or subsets (e.g., ZigBee, High Speed Packet Access (e.g., High Speed Downlink Packet Access and/or High Speed Uplink Packet Access), Bluetooth, Mobile-Fi, Ultrawideband, Wi-Fi, WiMax, mobile WiMax, cellular, satellite, etc., referred to as the transceiver protocols) that may be automatically detected and selected (through a handshaking, for example, that may automatically determine the source type of the transmission e.g., by a query for example, and may attempt to match it) and may enable this automatic access through one or more communication nodes. In some systems, automatic selection and/or detection may occur through an exchange of signals that acknowledge a communication or a transfer of information or data may occur at a desired or predetermined channel capacity. In some alternative systems, a device **300** may not directly communicate or connect to a central base station. Like a mesh network, the devices **300** may transmit information between themselves (like an electronic bucket brigade) which may be relayed to a destination. Built-in logic may allow some devices **300** to relay information from one device **300** to another when wireless networks are unavailable, device **300** failures occur, bandwidth restrictions occur, or other conditions warrant. In some applications, a receive-and-relay feature in some devices **300** may allow devices **300** to conserve power by not transmitting data or messages continuously and directly to base stations. Some devices **300** may communicate data across relatively short distances (e.g., a few yards or 100 yards between mobile or stationary devices **300**, for example) instead of the larger distances a communication to a stationary wireless base station may require.

FIG. **4** is a block diagram of an exemplary in-vehicle computer system. The on-board portable mobile device **300** may include an on-board data storage device (or storage devices), an input/output interface that may communicate with one or more external devices, one or more central processing units, a local memory that may be separated into multiple partitions or portions, and/or a real-time operating kernel. In alternative in-vehicle systems, the portable mobile device **300** comprises one or more controllers or microprocessors that may be interfaced through expansion connectors. The device **300** may support two or more (e.g., multiple) modulation schemes and may include two or more input/outputs to different wireless networks or protocols. The inclusion of multiple protocols and/or inputs/outputs may allow the device **300** to support higher throughputs as wireless networks and connections become available or accessible. The exemplary in-vehicle systems are shown in FIGS. **4**, **18** and **23** may be non-portable or a unitary part of a vehicle too. Each of the systems may include memory accessible only to a remote site or an insurer. The memory may be inaccessible to other in-vehicle OEM or aftermarket systems to ensure data integrity. Hardware, data encryption, or software may maintain data security. Data accuracy and/or conformity may be important to users or applications that insure risk or monitor safety.

The device **300** may communicate with one or more machine or vehicle components to acquire information from the vehicle that describe or represent vehicle operation or characteristics, or driving behavior. An optional driver input interface or console **410** may allow the driver to input data to satisfy or respond to one or more threshold factors or requests. For instance, the interface or console **410** may allow the machine operator to enter an identifier (e.g., identification number) so that recorded characteristics may be associated with a particular machine operator. Alternatively, the console may include or interface a biometric sensor, such as a fingerprint or retinal scanner to identify an operator, for example. A driver authentication system may validate a driver when multiple drivers (e.g., same family members, multiple users, etc.,) operate a vehicle. Each may have different ratings (e.g., driver rating, safety score, insurance rating/score, etc.) that may be used in insurance or risk computations.

Vehicle operation may be monitored through one or more sensors **412** (e.g., powertrain sensors, safety sensors, entertainment and comfort sensors, ancillary sensors, etc.). Additional sensors **414** may communicate wirelessly or across a physical or virtual data bus directly to the device **300**.

A vehicle may be linked to a network or remote control center **416** through one or more communication links **418**. In some systems the communication link comprises a wireless link (e.g., cellular link, a satellite link, a radio frequency link, etc.), a magnetic or optical link, or other tangibly free links. A navigation sub-system **420** may receive navigation signals from a positioning device **422** that may include, but is not limited to, a GPS, radio frequency tags, or other locating technology. The navigation sub-system **420** may communicate directly with the device **300** or through surrogates.

Some of the elements monitored and/or recorded by the device **300** include raw data elements, calculated data elements, derived data elements, and subsets of these elements (hereinafter data elements).

Raw Data Elements:

Information from powertrain or related sensors may include:

RPM,
transmission setting (Park, Drive, Gear, Neutral, etc.),
throttle position,
engine coolant temperature,
intake air temperature,
barometric pressure,
vehicle speed,
manifold absolute pressure,
oxygen sensor,
coolant sensor.

Information from electrical sensors may include:

entertainment status (e.g., visual or audio systems integrated or interfaced to vehicle) brake light on,
turn signal indicator,
headlamps on,
hazard lights on,
back-up lights on,
parking lights on,
wipers on,
doors locked,
key in ignition,
key in door lock,
horn applied,
battery voltage,

Information from body sensors,

airbag deployment,
ABS application,
level of fuel in tank,
brakes applied,
accelerator applied,
radio station tuned in,
seat belt on or off, door open,
tail gate open,
odometer reading,
cruise control engaged,
anti-theft disable,
occupant in seat,
occupant weight,
accelerator/brake pedal depression (e.g., measured in degrees or force applied) accessories (e.g., mirror settings, dash light status, etc.,)

Information from other elements may include:

vehicle speed,
vehicle location (e.g., navigation related information),
date,
time,
vehicle direction,
IVHS data sources (e.g., wide-area Intelligent Vehicle Highway Systems),
pitch and/or roll,
relative distance to other objects (e.g., may be monitored to assure compliance with an assured clear distance rule that may require drivers to be able to stop their vehicles within a distance they may clearly see).

Calculated Information may include:

deceleration,
acceleration,
vehicle in skid,
wheels in spin,
closing speed on vehicle in front,
closing speed of vehicle in rear,
closing speed of vehicle to side (right or left),
space to side of vehicle occupied,
space to rear of vehicle occupied,
space to front of vehicle occupied,
lateral acceleration,
rotation of vehicle (e.g., sudden),
loss of tire pressure (e.g., sudden);
driver identification (e.g., through voice recognition, code, fingerprint, retinal, or other recognition);
distance traveled; and
environmental conditions (e.g., potential hazards, rain, ice, etc.).

Derived Data Elements may include:

vehicle speed in excess of speed limit;
observation of traffic signals and signs;
relative braking or acceleration or deceleration events;
road conditions;
traffic conditions; and
vehicle position.

Other elements may be monitored and retained in local memory with optional metadata. The time a file is created or written to such as a timestamp or size of a file may comprise metadata.

FIG. **1** is a flowchart of a data capture process. The data may be processed for insurance, risk management or assessment and/or claims processing purposes. The process may be implemented through a real-time operating kernel within the device **300**. In some systems and processes, users employ a unique logic (e.g., a circuit and/or software) associated with that user's machine or unit of risk. When the system is started **100**, a data capture may be initiated by a trigger event **102** which may include, but is not limited to:

Ignition On/Off (e.g., may measure length of time an ignition switch is activated) Airbag Deployment
Acceleration Threshold
Velocity Threshold
Elapsed Time
Battery Voltage Level
System Health
Date
Time
User Activation/Panic Button
Traction
Location/Geofencing
Driver Identification
Remote Activation
Vehicle Motion
Revolutions per Minute
Transmission or Clutch Engagement or Disengagement
Power Bus Activation (may measure the length of time power is sourced to a bus or a conductor)

Trigger event processing **104** may comprise multiple elements that may include: a flow process for contacting a central control **106**, contacting a claims dispatch, and/or record-

ing trigger event data **110**. Trigger event processing may include, but is not limited to:

Contact External Entities

EMT (Emergency Medical Transport), Claims Dispatch, Other External Entity Takes Appropriate Action

Record Sensor Information

Transmission of Data

Message transmissions

Recalibration

Load Software

If trigger event processing comprises a contact to a central control **112**, the inquiry may be transmitted and confirmed by a message exchange. At **114**, the central control **112** may take appropriate action and a record may be made by the central control at **116**. In some instances, a central control **112** or the device **300** may transmit an alert directly or indirectly to third parties. An alert may occur when another party or user is monitoring another's driving behavior or vehicle performance. For example, a text message (e.g., a Short Message Service), a telephone call, or other messages may be transmitted to a party or a destination when an incident occurs (e.g., a parameter is exceeded or violated). An incident may occur when a commercial, teen, or inexperienced driver exceeds a programmed speed threshold or exceeds a designated speed limit (e.g., tracked by GPS, local mappings, and a vehicle speed output), exceeds a mileage limit, or is not wearing a seatbelt, for example. In some devices **300**, an incident may allow the party or destination to communicate with a driver or passenger by phone, voice, text, or other messaging service through a wireless processor (e.g., see FIG. **23**).

In some circumstances, the central control **112** or the device **300** may service a vehicle (e.g., through an in-vehicle or external speech recognition system, a telephone call to the device **300**, etc.). Upon an authentication, the central control **200** and the device **300**, or the device **300** itself may lock or unlock vehicle doors or execute some other action. In some systems, one or more in-vehicle recognition systems may authenticate a user (e.g., an in-vehicle speech recognition system may authenticate a user's voice, one or more in-vehicle biometric scanners may identify a user's retina, touch, or other biological feature(s), or other in-vehicle devices may identify other user characteristics) when a user is remote from or in proximity to a vehicle. Once authenticated, the device **300** may service a user request or service a vehicle without receiving directions, and in some cases, communications from a remote destination, such as a remote control center. Entertainment and/or comfort settings may also be adjusted in some alternative systems to a user's preference with or without directions or commands from a remote destination. In other circumstances, powertrain and service reminders may also be transmitted to a designated party through an aural and/or visual alert.

When processing a claims dispatch in FIG. **1** at **108**, the system may contact the claims dispatch service department of the insurer at **120**. The claims dispatch takes appropriate action at **122** and a recording **124** of the claims dispatch action information may be logged to a file before the process concludes at **130**.

The recording of trigger event data may include, but is not limited to:

The Trigger Event

Location information, such as latitude and longitude

Time, such as, Greenwich Mean Time

Velocity

Acceleration

Direction

Deceleration

Vehicle Orientation

Seatbelt Status

Turn Status (e.g., a hard turn or lateral force detection)

The recording may include one or more raw data elements, calculated data elements, and/or derived data elements. Each element may describe an operating state of the vehicle or an action of an operator or passenger. One or more selected data elements may be stored in a local memory of the device **300** before the data elements are transferred to a remote memory. Element selection may occur before the device **300** interfaces the vehicle or when a data element has a relationship to a safety standard, operational metric, or measure of risk. For example, vehicle speed may be related to safety. Therefore, speed may be recorded synchronously (e.g., on a regular basis or may occur at fixed programmable time intervals, such as every 10 seconds). Alternatively, where memory or storage space is a factor, speed may be recorded asynchronously or less often when the speed is below a predetermined or programmable threshold. In alternative systems, data may be recorded at synchronous intervals and during or after asynchronous events. The recording may include or may be associated with date, time, and/or location information. Other examples of data that may be recorded include rates of acceleration, deceleration, and/or hard braking events. Some of these data elements or events may be remotely or locally derived. For example, acceleration or distance may be derived from speed measurements made at a fixed interval (e.g., every second) or derived from measured data retained locally within the device or remotely at a remote server. In some devices, acceleration or deceleration data elements may be monitored directly or indirectly from one or more vehicle accelerometers or devices that may measure acceleration and/or deceleration.

In a synchronous mode, the recording process may be implemented by monitoring and storing the data in a local buffer after/at pre-selected selected time periods (e.g., that may comprise a cycle time of a processor or controller of the device **300** or a longer period, such as about every thirty seconds of vehicle use, for example). In an exemplary operation, the output of the monitored sensors (e.g., the data elements) may be written to a file (e.g., at a fixed programmable interval such as every two minutes, in this example) which is stored in a portion of the local memory of the vehicle data storage within or accessible to the device **300**. The raw, calculated, and/or derived data elements may comprise some of the data elements that may be stored locally or remotely. Desired data elements or those determined or deemed to be relevant to an insurer or an assessment of risk may be stored in this exemplary device **300**.

Some "trigger events" may occur when a condition is detected by one, two, or more sensors. The sensor data may indicate the need for an action. In an insurance application, it may result in an assessment of a premium, or a surcharge or discount to a premium, during an insurance billing process. In some systems, a trigger event may cause an immediate or almost immediate transfer or exchange of data, such as a data upload **106** to a network, surrogate, or a central control. For example, a rapid deceleration and an airbag deployment may be a trigger indicating a collision event, in which the system may notify the central control of the vehicle location and status at a rate the data may be received (e.g., real-time). Alternatively, if an operator were to cause an emergency light to activate or an alert to issue, the system may notify the central control of the emergency, and in some systems, vehicle location.

Some systems may classify or divide trigger events into two or more classes or grouping. Two groupings may include those requiring immediate action and those not requiring immediate action, but useful for determining a cost of insurance, measuring risk, or monitoring performance. Those useful for determining a cost of insurance or measuring risk may be stored in a file with other recorded vehicle sensor information in a logically distinct portion of a memory. Those trigger events requiring action may be stored in a second logically distinct portion of a memory before being transferred to a network or central control center which may take further action. Some trigger events may indicate the need to send emergency services, such as police or EMS, and may be stored in another logically distinct portion of a memory and others may indicate the need to dispatch of a claims representative or agent that may be associated with an insurance company that are stored in another logically distinct portion of memory.

The following comprises an exemplary list of some, but not all, trigger events.

Need for Assistance:

These are some of the exemplary events that may require immediate notification of a surrogate or central control center.

1. Accident Occurrence. An accident could be determined by monitoring an output of a single sensor, such as the deployment of an airbag or a sustained lateral acceleration. It could also be determined by monitoring a combination of outputs from two or more sensors that may indicate, for example, a sudden deceleration of the vehicle without the application of the brakes.
2. Roadside assistance needed. This could be determined through the pressing of a "panic button" in the vehicle or through the reading of a sensor output, such as the level of fuel in the tank. Another example may be a rapid loss of tire pressure, signifying a flat tire.
3. Lock-out assistance needed. The reading of two or more sensor outputs may indicate that the doors are locked, but the keys are in the ignition or in the vehicle and the driver has exited the vehicle.
4. Driving restrictions. The insured or another user may identify circumstances or restricted areas in which he/she requests notification of driving (outside of a designated area or) within restricted areas, and warned when he/she or another is entering a dangerous or restricted area (or leaving a designated area). This may apply to youthful drivers, where the parent wants to restrict time or place of driving, driving behaviors in predetermined areas and have a record thereof.

Unsafe Operation of the Vehicle:

These exemplary events may be recorded and stored in the in-vehicle portable recording device **300** for future upload. Individual or repeated trigger events may result in notification of the driver of the exceptions.

1. Excessive speed. A reading of the output of the vehicle speed sensors might indicate the vehicle is exceeding the speed limit. Time may also be measured to determine if the behavior is prolonged.
2. Presence of alcohol or controlled substances. Using an air content analyzer, breath analyzer or other identifying device outputs or combinations that may identify driver impairment (e.g., touch or a pattern matching behavior), the level of alcohol or other substance and/or their use may be determined.
3. Non-use of seatbelt. Frequent or infrequent use may result in a discount (to a premium for high use) or surcharge (to a premium for low or no use).
4. Non-use of turn signals. Low use could result in surcharge. Frequent use may result in a discount.
5. ABS application without an accident. High use could indicate unsafe driving and may be subject to a surcharge. Low use may result in a discount.

FIG. **2** is a block diagram/flowchart of a network design for gathering information for insurance billing at synchronous or asynchronous intervals. A machine or unit of risk **200** (or device **300**) may interface and monitor an industrial machine, farm machine, an airplane, boat, RV, a motorcycle, or other vehicle (e.g., a device or structure that transports person or things). The device may include a local data storage **202** and data process logic **204**. The insured or potential customer **206** associated with or responsible for each unit of risk may communicate with an insuring entity **208** or a designee. A "designee" may be an intermediary acting for an entity or an insurer, such as a dedicated data collection agent, data handler or equipment vendor **210** and/or a value added service provider **212**. The data handler may be a third party entity verifying that the operating equipment of the system is in proper working order and may be a subcontractor. A value added service provider may be a third party entity, such as a directional assistance service, a security firm, a vehicle monitoring company, telephone service provider, or another entity whose communications with the units of risk may be important or relevant to assess risk or may be used in insurance computation algorithms.

In some systems, the insured or potential customer **206** may communicate directly with the insurer **208** through a wireless or a physical communication link **418** (FIG. **4**) that may include a publicly accessible distributed network, such as the Internet **218**. Such access may allow users to view documents, access files, and access software related to those files while on the move or at fixed location. Access to a Web server **220** and the insurer's Web site may allow an insured or potential customer **206** to observe, and in some instances verify, recorded data, derived data, calculated data, claim processing, insurance costs and risk scores and the occurrence and state of trigger events, and billing **222**. Access may further allow an insured or potential insured to acquire insurance cost estimates through a relational database or other storage systems and view content that may reduce current, future or prospective premiums. The content may describe how to reduce or control insurance costs by modifying machine or vehicle operating behavior.

FIG. **5** provides a more detailed exemplary description of a distributed system's use of data acquired from a unit of risk **200**. Some units of risk **200** (device **300**) may synchronously or asynchronously transfer one, two, three, or more classes of data to an insurer. The event data **500** and stored sensor data **502** may capture data from the unit of risk **200**. Data process logic **504** may be transferred to the unit of risk **200** from the insurer. The data process logic **504** may be adapted or programmed to acquire data that may be relevant to assess a unit's insurance cost or level of risk. For example, if an insurer or entity has a need for information about brake pedal use or application, data process logic **504** may be programmed or configured to store data related to that use or application. For alternative assessments, such data may be unnecessary and so the unit of risk **200** may not interface with data process logic **504**, or it may acquire other data. The data process logic **504** may be programmed, configured or customized and may be updated as the insured, the insurer, or the potential customer desires. The data process logic **504** may be programmed, configured or customized while interfaced to a vehicle (may be field-programmable). In some applications,

the data process logic may **504** be programmed to acquire data related to breathalyzer or other analysis.

In FIG. **5**, the flowchart starting at **506** describes an exemplary communication between an insurer and the unit of risk **200**. The insurer may acquire event data at **508**, acquire sensor data at **510**, update data process logic at **512**, and process data elements at **514**. The result may generate data elements, such as a safety rating, insurance rating/score, or a driver score at a remote site. In alternative embodiments, the device **300** processes data elements in the vehicle and stores the raw, calculated and/or derived elements (including the ratings and/or scores) in an in-vehicle memory. The data may be uploaded to a network and a remote computer that may display or render the data locally or may be transmitted to another remote location with or without raw data elements. In some systems, data is stored **516** in a media or nonvolatile memory, such as a data storage device **518**. If the stored item is an event **524**, an insurer may transmit an event response. For example, when an airbag deploys data may be delivered to the insurer as the data is received (e.g., in real-time) or after a minimal delay. The insurer may communicate or attempt to communicate with the vehicle when the data is received. If the communication fails, the insurer may contact emergency medical or police services.

In some systems, if specific events processing and/or alerts **526** occur, the system may charge a user on a per-use, a subscription, or an event-basis. In some applications charges may reflect an immediate response claim, EMS charges, and/or dispatch charges. The data or events may be stored in a remote server **220** or in a remote storage device **518** that may be accessed by a billing or estimating algorithm **530** programmed and executed in a controller. The data may be used to generate a cost of insurance for the unit of risk **200** with some or all other relevant data. The cost may reflect one or more occurrences that are recorded and stored in the storage device **518**.

In some applications, the cost of insurance may be based, in part on, the operating characteristics of the vehicle and/or operator behavior within a time period. A usage-based insurance cost may be based on the real-time data that is generated contemporaneous with or near a billing event. In some applications, the system may generate an invoice based on a driver's own data instead of an estimate based on interviews and historical trends. Alternatively, customized discounts or surcharges (to premiums) may be determined for a next billing period (e.g., a prospective period) based on operational aspects or behaviors captured by the recorded information. The data may be processed during a current or previous billing period. When a cost is computed, a bill or estimate may be generated and mailed, transmitted, or otherwise communicated as an account statement **534** or as an offer of insurance.

FIGS. **10**-**17** illustrate documents and screens that a server may retrieve or generate and transmit in response to requests received at a proxy or origin Web server **220**. The Web server **220** may allow a user to request and access content through a publicly accessible distributed network like the Internet **218**. Through remote software that allows users to view documents and files and software related to those documents, a user may view sensor data, event data, ratings, and/or analysis.

Different types of on-line services' interfaces may be accessed through the Web server **220**. The figures illustrate exemplary documents and screens that may be rendered through different interfaces. The interfaces include a prospective on-line services interface **550** and an interface for reporting acquired data and relationships **552**. The data reports rendered through the acquired service interface **552** may comprise all or selected stored events, sensor data, metadata, and/or relationship data (that may describe relationships between selected data or events to other data and events). The acquired service interface **552** may provide enhanced processing maps showing travel routes (e.g., during a desired or a billing period) and other maps, such as maps that identify current locations of the unit of risk. A site's ability to report a geofence may allow a user to identify when a unit of risk or device **300** travels outside of an imaginary boundary. When a unit travels outside the boundary (e.g., set by a user, the insurer, or another) the site may identify the unit's location and travels. In some systems, the location coordinates (e.g., GPS-coordinates) may be transmitted by a short-message-service and a wireless (e.g., the transceiver protocols described above) network. Some sites determine whether automobile maintenance service is appropriate through a diagnostic analysis of the sensor and event data.

A prospective interface may relate to "what if" evaluations, in which a customer may change or enter certain values that may reflect the actual or hypothetical operation of the unit of risk or a driver's actions. The system may render or reveal the effects of those changes or values (e.g., in a risk assessment or an estimated cost or a proposal of coverages). The "what-if" evaluations may be based on historical data, customer profiles, logical relationships (e.g., relationships between relative levels of risk and monitored vehicle data), matrices, or other analysis (or any combination thereof) that may quantify risk in a use of the device **300**. Through an interface, a user may determine, in advance, what behavior may reduce risk or cost, or what coverages may be available for such a profile (e.g., an insurance estimate). Enhanced account statements **554** may also be rendered and transmitted to remote interfaces on-line. The account statements **554** may include maps of usage, detailed explanations, and accountings of costs.

Monitoring the unit of risk **200** or using the device **300** may generate improved rating determinations or driver scores due to an improved acquisition and retention of user data. In some applications, a database **518** retains data from many customers and/or potential customers **206** and/or other drivers/operators. In time, an insurer may use the accumulated underwriting, rating, or driver score information from individual customers **520** to establish relationships between users or user profiles and levels of risk. Direct data acquisition may improve rating algorithms **522**, **530**. The algorithms and relationship may be retained in databases **518** remote from or within the unit of risk **200** or device **300**.

Data acquired by the unit of risk **200** or device **300** may be used for insurance and non-insurance purposes, such as advertising and marketing; site selection; transportation services; land use planning; road design, surface or composition analysis, traffic planning or design; or monitoring road conditions. For example, a method **714** for underwriting insurance related to the operation of a machine is shown in FIG. **7**. The method includes determining a willingness of the party to allow one or more aspect of machine operation to be recorded at **718** and providing a device for recording one or more aspect at **722**. At **726**, a site or insurer may assign or assess a level of risk to the operation of the machine based in part on the indicated level of willingness of the party to allow aspects to be recorded. At **730**, the insurer or site may determine whether or not to offer insurance based on the level of risk. At **734**, a site or insurer may set a price for insurance coverage based on an assessed level of risk.

Since the price or cost (of insurance) may be determined (at **734**) based on an assessed risk (at **726**) and the level of risk may be based on willingness of a party or operator to allow an

aspect to be recorded, the process may reward users based on their driving abilities and the driver's acceptance of a usage-based (insurance) program. Aspects of the method of underwriting and pricing insurance shown in FIG. **7**, such as the presentation of cost and other information that may influence machine operator behavior and affect insurance costs. The safety and savings may be marketed to sell insurance.

A measure of a parties' willingness to allow an aspect of a machine to be recorded at **718** may be made in many ways. For example, if an unsolicited request for the device (e.g. **300**) for recording is received, it may indicate a relatively high level of willingness or enthusiasm to have one or more aspects of machine operation to be monitored and/or recorded. In time, data may show that machine operators or owners who are not customers of an insurer, but who request the device for recording, are more enthusiastic or have a greater willingness to have one or more aspects of their machine operation monitored. Their willingness may be greater than current customers of that insurer who request the device. In other circumstances, it may be determined that current customers that have access to contact information and may request the device with less effort are less enthusiastic than a non-customer. A request for the device after receiving an offer may indicate a similar willingness or may indicate a somewhat diminished level of willingness. Responding to an offer may require less effort than someone who has not received an offer but requests the device.

In some circumstances, a level of willingness to have an aspect of machine operation monitored may be related to a user's driving behavior. For instance, some may assume that users that believe they are careful drivers will be more willing to have one or more aspects of their driving, such as, for example, the speed at which they drive, monitored. In contrast, others that may be more reckless may be less willing to have one or more aspects of their driving monitored. In some circumstances, these assumptions may not be true. Over time, an insurer may acquire and compile data in a database (e.g., **518**) that includes information correlating to or establishing relationships between the willingness (or unwillingness) to have an aspect of machine operation monitored and a level of risk for one or more classes or categories. The data may be correlated with other user's data that describes actual vehicle use.

In some situations, parties that use the device **300** or unit of risk **200** may indicate a greater willingness to allow one or more aspects of machine operation to be recorded than do those who merely request the device, but fail to use it. In some uses, it may be assumed that those parties who install the device **300** and allow it to record machine data are more likely to be careful machine operators than are those who do not. Furthermore, those who review the recorded information locally or on-line may show a greater willingness to allow monitoring and may be among the more careful drivers. These users who provide the recorded information to an end-user may show an even greater willingness to be monitored and may be the most careful operators.

Each assumption may be subject to verification and change. Verification may analyze the collected data, correlate the data to actual losses, and relate the data to actuarial classes.

A level of risk assigned or associated with a party and/or the operation of a machine may be based on many factors, including demographics such as the sex, age, marital status, and/or address of an insured party or machine operator. Assigning a level of risk at **726** or establishing relationships (that may be retained in one or more databases) to the operation of the machine may be based in part on a measure of willingness to allow one or more aspects of vehicle operation to be recorded. This association may be assessed on known factors or through an analysis of retained data.

Assigning a level of risk at **706** to the operation of a machine may include an evaluation of selected data recorded by the device **300**, or a copy thereof. Where the machine is a vehicle, such as an automobile, truck, motorcycle, RV, boat or airplane, one or more recorded aspects of machine operation may include speed, acceleration events, deceleration events and/or locations where the vehicle was operated and/or any individual or combination of those events or elements. Other individual or collective aspects that may be recorded include seat belt use, turn signal use and/or the times and dates of vehicle use. One or more of these aspects of machine operation, either alone or in combination with one or more other characteristic (that may include operator age, sex, location, selected demographics, etc.) may be compared to assess risk. The conclusions may be compared against assumptions about safe operation determined by an insurer or through actuarial data acquired or compiled from similar data to validate or adjust risk assessments. The results of such comparisons may be used to assign a level of risk at **726** to a driver or owner that is retained in a database, database management system, or other storage systems.

The collection and assessments may have many applications. For example, if the data received from the device **300** indicates that a relatively high percentage of vehicle operation is done at a speed deemed to be unsafe, the operator and/or machine may be placed in or assigned a high risk category. Additionally, or alternatively, if the recorded aspect(s) indicates a relatively large number of aggressive accelerations and/or decelerations for a number of miles driven, the operator and/or vehicle/operator may be assigned a high risk category or actuarial tier. In these applications, previously known actuarial parameters may be processed when evaluating the recorded aspect(s). In some analysis, location-based actuarial data may indicate that the safest class of drivers may perform rapid decelerations frequently in urban settings when compared to safe drivers traveling through rural areas. In this analysis, allowances may be made for location or other factors. When location information is not available, a location may be determined from other data.

Data may be stored or processed in relation to a trip. A trip may start when motion is detected or when the vehicle ignition is turned on (or data, such as speed data, is first detected or received and vehicle voltage exceeds a programmable threshold) and ends when motion ends or when the ignition of the vehicle is turned off (or when data, such as speed data, is not detected or no communication occurs within a programmable time period or vehicle voltage falls below a programmable threshold, or in response to an insurer's or other entities command). In alternative devices **300**, one or more combinations of these conditions may identify trips (e.g., a beginning and/or end of a trip). When motion sensors are used, a physical mechanism or electronic sensor may quantify motion. The device may be integrated with or in communication with the device **300** or a vehicle. In many applications, the device **300** may provide data that allow programs to reach conclusions. If a high percentage of the recorded trips are short (e.g., below some threshold distance and/or time), then a system may conclude that the vehicle is garaged in an urban area or is used primarily for city driving. In some analyses, the speed at which the vehicle is driven during the short trips may influence (or be a factor in) such conclusions.

Data validation or verification may also be part of the process of assigning the level of risk at **726** and/or in setting the price or cost of insurance at **734**. For instance, the device

300 may log vehicle identification information (e.g., vehicle identification number or "YIN") and/or or network protocol information when the device initially interfaces a vehicle control system. Some information may be available from an in-vehicle network and may be requested, transmitted, received, and written to a non-volatile memory of the device 300. Additionally, where the device 300 or machine include an optional interface that allows a user to enter information (e.g., operator identification, code numbers, I.D. cards, biometric scans), this information may be received and stored in the memory of the device 300. Where the device 300 or vehicle include, or communicates with, location determining systems (e.g., GPS, wireless triangulation, trilateraleralism of encoded signals, etc.), this information may be stored in a logically distinct or common portion memory. The recorded and stored information may be compared against information recorded or transmitted earlier by the party. A recorded VIN may be compared against a vehicle description provided by the party when applying for insurance. Similarly, location information retained in the device may be compared against "garage location" information provided by a user (e.g., in a policy renewal form, for example). Operator identification and vehicle mileage information may be compared against operator lists and mileage estimates provided by the user (e.g., in policy application forms).

When incorrect data is found it may be corrected and the inconsistency (that may be found through comparisons with applications or renewals, for example) may be considered in cost calculations. In some circumstances, incorrect data may indicate a fraud. The detection may place a party in a lower or uninsurable underwriting class or in a higher risk tier.

The assigned level of risk at 726 may include an assignment of one or both of an underwriting tier and an insurance rate. The level of risk at 726 may be used to determine whether or not to offer insurance at 734 or establish a price for the insurance at 734.

The marketing method 714 may serve current customers or potential customers (e.g., those who are not current customers). Potential or current customers of an insurer may access stored data of one or more aspects of the operation of a machine through customizable software that allows users to access documents and files and software related to those files. These users may review data regarding one or more aspects of machine operation and, in some instances, relationships between many users and the relative levels of risk associated with those users. This may occur on a regular basis, at policy renewal time, when a potential customer is evaluating insurers, or at other times. In reviewing the data, the current or potential customers may indicate a willingness to allow an aspect to be recorded. Furthermore, after such reviews, or instead of them, the current or non-customer may transmit the recorded data to the insurer for the insurer's review and analysis. The analysis may determine a price (e.g., prospective or retrospective) for insurance coverage. In some circumstances, a retroactive discount may be offered against an insurance premium for a period that was monitored. Alternatively, assumptions may be made about future behavior based on the recorded data and/or the established relationships. The analysis may result in a discounted or a higher premium for prospective insurance periods. Non-customers may receive estimates or offers of insurance electronically or by courier (e.g., postal mail) that may include pricing information based the non-customer willingness to review recorded data.

The system may also serve a prepaid customer. When a customer contracts for insurance on a prepaid basis (e.g., per mile, kilometer, or per minute, or other unit of time), a user interface may allow the user to review the recorded data. The review may allow users to display a number of miles driven or number of minutes or miles remaining on an account. It may allow users to estimate when a prepaid insurance balance may be consumed.

Decisions about insurance levels and insurance periods may be based on a willingness to allow one or more aspects of machine operation to be recorded at 718 and be transferred to an insurer. These determinations may be considered when deciding whether or not to offer insurance at 730 and its term. For example, it may not make sense to enter into a long term agreement with an operator or machine owner associated with or assigned to a high risk level (or high underwriting tier). However, a shorter term may represent an acceptable risk.

Assumptions may be tested. For example, a non-customer may request a device 300 for recording one or more aspects of a machine. The non-customer may install the device and store one or more aspect of machine operation for a trial period. The data may be transmitted or uploaded through a wireless, tangible, or combination network to a remote server at an insurer. In this example, it may be assumed, or it may be supported by actuarial information, that the non-customer is a responsible, law abiding, careful vehicle operator. Nevertheless, the uploaded data may indicate that, for example, the non-customer drove at excessive speed and/or with overly aggressive accelerations and decelerations. For these reasons, the insurer may be unwilling to extend certain insurance coverage to the non-customer and/or make a long term commitment. However, the insurer may be willing to minimize risk and improve an expected return by underwriting a limited coverage for a shorter term or by charging an additional premium. Less coverage, a shorter term, and/or continued data monitoring may cause the non-customer to change his/her driving behavior. As driving behavior improves, the likelihood of a better assessment may increase. If successful, the insurer may determine 730 to underwrite more coverage for a longer period and/or set a lower premium for such coverage.

The behavior modification and/or cost control aspects of the method for marketing insurance 714 may also include providing a remote interface to access "what-if" evaluations. The interface may allow users that record vehicle data to transmit the data to a remote insurance server cluster or site that provides the user with an opportunity to enter or change values to reveal the effect of those submissions. A user may adjust or evaluate different parameters, such as speed and distance traveled, to learn how these changes may affect their costs over time, such as an insurable term. The software may accept a user's changes or even recommend changes automatically to highlight differences.

Behavior may change when users have access to data. A remote interface may allow users to view documents and access files and software related to those documents at a remote location. The remote interface may be customized to the user's preferences and may allow the party to upload or transfer the recorded information, or a copy thereof, from the device 300 to a remote computer or an insurer's remote server. The remote interface may transfer or render some or all of the data retained in the device 300 or selected information. In some systems, the remote interface may display graphs, animations, or graphics that may include one or more stored data elements (e.g., the recorded speed of a vehicle, distance traveled, the duration of trip(s): on a minute by minute or other time related basis, metadata, etc.). Alternatively, the remote interface may render information indicating a percentage of time the vehicle was operated within particular speed ranges, and/or at high risk or low risk locations (routes), and/or times, with aggressive accelerations or decelerations, summaries or information about another aspect

(e.g., turn signal use, seat belt use, vehicle roll, vehicle yaw, entertainment system on or off status, radio or television station, compact disc, digital video disks, or other entertainment being played, telephone use, convertible top up or down status and/or tire pressure, etc.). Where the machine is industrial or farm equipment, other aspects may include line speeds, operating pressures, safety gate status, temperatures, operator run times, machine configuration information (e.g., harvester, plow, planter, or other configurations), etc.

In some systems, client-side software executed by a remote interface may allow users to review information. The content may indicate how the recorded information may affect a prospective or retrospective cost of insurance. For example, the software may display the recorded information with a message indicating that a five percent discount may be available if the data is transmitted to an insurer or a service provider. Additionally, or alternatively, the software may automatically highlight portions of the stored data that may qualify the party for additional discounts or surcharges. These highlights may be explained through hyperlinked documents or tags that may not be visible to the user, but may be activated by selecting or hovering an absolute or relative pointing device over a link or tag.

In some systems, the interface that allows a party to review recorded information about one or more aspects of machine operation allows users to compare operational behavior to the operational behavior of others. For instance, a party's recorded data may be compared against an average or aggregate set of data received from other users. Statistical or other comparisons may be made. These comparisons may compare a user's data to an average or aggregate of some or all parties who have uploaded data, an average, or aggregate of data provided by operators with similar demographics or characteristics (e.g., age, sex, location, etc.), an average or aggregate of data provided by parties associated with similar machines (same model car, same model milling machine, same size heat treating furnace, same model tractor or same model combine) or a combination of other classes of data.

In some systems, the interface that allows a party to review recorded information may include a transceiver or transmitter that may transfer the recorded information, or a copy thereof, from the on-board portable mobile device **300** to a device or destination that may deliver a portion of the information to the user. A transfer may be made by a wireless or physical link. The connection may be made by a cable that links the device **300** to a communications port (e.g., and RS-232, USB port or a parallel port) of a computer, programmable digital assistant, or other device. Alternative, complimentary, or backup connections may be made by devices compliant with low-power, wireless mesh networks (such as Zigbee), a multilayered communication protocol (such as Bluetooth®) or other wireless networking or communication technology (including the transceiver protocols described above).

In some systems, a compatible interface may enable the device to connect to a remote computer (e.g., a home computer), a work station, or personal digital systems (that may include a display device). If the ancillary device is portable or is in proximity to the on-board portable mobile device **300**, a physical or wireless connection may be made. For example, a cable may link a personal digital assistant or laptop computer to the on-board portable mobile device **300** while the device **300** is physically connected to an OBDII connector or virtually connected to a vehicle interface.

Through a wireless interface, data may be delivered to a user and displayed even when the display is remote from the on-board portable mobile device **300**. For example, the on-board portable mobile device **300** may establish a connection with a remote computer when the vehicle is parked in proximity to a home or a remote network interface. A vehicle may be parked in a driveway or a garage and be within range of a wireless connection. When a connection is established, the technology may transfer a copy of the recorded information from the on-board portable mobile device **300** to a remote destination.

In some applications, the on-board portable mobile device **300** may be removed from the vehicle and connected to a remote transmitter, transceiver, display, or other device. In some applications, the device may be removed from the vehicle on a regular basis (e.g., monthly, quarterly, or yearly) to enable communication with a remote device, such as a display device. A wireless or physical connection may be established between a personal computer or other computational platform to allow the on-board portable mobile device **300** to transmit the record data. After a connection is made, some or all of the recorded data may be transferred or copied to a second device. The data may be displayed, processed, manipulated, analyzed, and/or compared to other data. In some systems, the data retained in the on-board portable mobile device **300** is stored and/or is transmitted in an encrypted format. When received in an encrypted format, the intermediary or destination may include software or hardware that restores the data to its original form.

In another application, an interchangeable component of the on-board portable mobile device **300** may be physically removed from the device **300** to transfer data. Some devices may include a self-contained assembly of components and circuitry, such as a removable memory card or stick. Data may be stored on the removable storage element. When the storage element is interfaced to a remote device, the data may be transferred to a remote site. In some systems, the removable element may be erased after a data transfer. Once transferred, the removable element may be reconnected to the on-board portable mobile device **300**. Should the removable element not be erased, the data may be archived and a replacement may be reconnected to the on-board portable mobile device **300**. If the interchangeable device comprises a memory, it may comprise memory sticks or other devices that may store and retrieve data. Some interchangeable devices may comprise movable media, such as floppy disks, recordable compact disks, digital video disks, static media such as block-oriented memory, etc.

Data transfer may occur automatically or in response to user commands. When a transfer occurs, a party may be rewarded with a discount for transmitting the data to a remote destination, such as an insurer's server cluster. The data may indicate that an insured party is entitled to an additional discount or subject to a surcharge. If a party is not a customer, a quote may be transmitted to the user.

In some systems, data is stored in multiple forms in the device **300**. The first form may comprise an encrypted form for communication with a display device, node, or an external device. A second set of data may be encrypted in a second format through a second encryption algorithm or device. The second set of data may be transmitted to a second node or service provider, such as an insurer. The encryption schemes may prevent unauthorized access to the data.

The interface that allows a party to review the recorded information may be local to a user (e.g., installed locally on the parties' personal computer or computing platform), may be remote to a user (e.g., installed on a remote computer or server and communicated through a wireless and/or physical link that may comprise an internet link), or may be distributed among a different platforms or locations. For example, the software and hardware that comprises an interface that pro-

vides a preview portion may be installed and run locally, (e.g., on a party's computing), while other detail or display functions may be served by a remote content provider through a server or cluster (e.g., a Web page server).

Some parties may be reluctant to provide information to an insurer unless the party is assured that the data will lower their expenses (e.g., reduce insurance costs). Through a distributed transaction processor or processing, a local computer may allow a user to review and analyze the data and control its distribution to a service provider, such as an insurance company. A separate computer or cluster may be programmed to analyze the data, assess risk, assess performance, or establish an insurance rate, and transmit some or all of the results of the analysis to the local computer. By distributing the analysis to a separate computer, some systems may provide the user with an incentive to transmit the recorded data to a third party.

For example, in FIG. **8**, preview software retained and running, for example, on a personal or local computer may receive and render a driving summary display **814**. The driving summary display **814** includes a policy discount section **818**, a graphical operating performance section **822**, and a numerical operating performance section **826**. Clicking or selecting an upload button **830** may direct the software to transmit encrypted data from the device **300** or local computer to a remote computer, server, or cluster. The remote computer, server, or cluster may belong or may be associated with an insurer or a third party service provider. When selected, hardware and software may activate a program that transmits the data through a physical or wireless link (e.g., an internet or telephone based connection).

When received, the remote server or cluster may analyze and/or transmit data that cause a display of the information in one or many formats. The display may include a numerical performance display section **826** that includes a logging start time stamp **832**, a logging stop time stamp **834**, and a percentage of time connected parameter **836**. The start and stop time stamps **832**, **834** may indicate the time period in which the data was monitored. The percentage of time connected parameter may indicate how faithfully the device **300** or interchangeable component of the device **300**, (e.g., a memory module) was used during that period. For example, if the percentage of time connected **836** was relatively low, it may indicate that the device **300** or interchangeable component was disconnected and did not record machine performance during long periods of time. This may suggest that the machine was operated in an unsafe manner during that time. A relatively high value, on the other hand, may indicate that the submitted data is representative of machine performance or driver behavior. In some systems, the percentage of time connected parameter **836** may be used to determine a driver's willingness to record operational data at **718**. This measure may influence underwriting decisions and rating scores. For example, when the percentage of time connected to a vehicle bus or controller is low, the low use may be associated with a higher level of risk that reduces or eliminates a discount.

The numerical driving performance section **826** may also display summary information about recorded parameters recorded by the device **300**. When appropriate, the information is presented on an annualized or customized basis. In FIG. **8**, the logging start and stop parameters **832** and **834** indicate that the summarized data was collected over a 31 day period. Software and hardware allows users to review machine use or mileage estimates based on a predetermined logging period (e.g., the 31 day logging period) through the remote interface. In some systems, projections may be based on the ratio of recorded days versus the number of days in a year; in other systems; the projections may be seasonally adjusted. The interface (and preview software) may project an annual daytime mileage of 14,958 miles based on the number of miles recorded in the logging period. Additionally, the interface and (preview software) may display a nighttime mileage projection **840** of 113 miles and a high risk mileage projection **842** of 0 miles.

In FIG. **8**, a client-side scripting may add interactivity and may customize the viewing or delivery of documents that may be updated dynamically. The page may include numerical performance display **826**, including indications **844**, **846**, and **848** that the vehicle is driven above 75 miles per hour 0.02 percent of the time, aggressively accelerated 16.8 times per 100 miles driven and was aggressively braked or decelerated 3.1 times for every 100 miles driven. The graphical operational performance section **822** may display these parameters **838-848** as pictorial representations, such as graphics or charts in relation to a comparison value, such as an average or nominal values **850**. The inclusion of a comparison value may allow the operator to compare individual operating habits or profiles to other operators or drivers or profiles.

In FIG. **8**, the discount section **818** of the operational summary **814** indicates that a total discount **852** may be based upon an upload bonus **854** or a rating factor, such as a safety score **856** and/or a usage discount **858**. Current customers may apply the discount **852** to a premium to determine a cost of insurance. Non-customers may apply the discount to a cost presented in an insurance quote. The insurance quote may be estimated, or, if the data is delivered to an insurer, delivered electronically in real-time, after a delay, or through a postal service, and may be a firm offer. In some systems, a cost of insurance notification is transmitted after the recorded data is transmitted or transferred to the insurer.

In some exemplary systems, an upload bonus **854** may reflect a portion of a discount applied to an insurance premium. It may reflect the willingness to monitor machine operation and the uploading, transmitting, or otherwise providing recorded data to an insurer. Other (e.g., lesser or greater) discounts may also be given. A discount may be given to users that record and review their machine (e.g., vehicle) data, but do not transmit the data to an insurer. A smaller discount may be given to those who request and install the device **300**, but do not review the data or transmit the data to an insurer. In some applications, a willingness less than that willing to transmit data to the insurer may be assigned **726** a level of risk that results in no discount, or may result in the assessment of a surcharge. The safety score **856** and usage discount **858** of FIG. **8** may be explained through secondary screens, windows, or documents that may be linked by tags or a markup language associated with text, icons, or other elements.

In FIG. **9**, a server side scripting may add additional interactivity and customizes the viewing or delivery of documents or objects that may (be updated dynamically and may) include a safety score or rating. The page or documents may include a score display **914** (that may include graphical objects) in proximity to a safety score explanation section **918**. Some safety score displays **914** may include the discount summary **818** and graphical performance section **822**.

In some systems, the safety score may be based on one or more driving or operational characteristics. In some systems, the characteristics may include a speed factor **922**, an acceleration (and/or deceleration) factor **924**, and/or a braking factor **926**. An on screen help feature in the form of a help window **930** or a cartoon like dialog balloon may appear when a user positions a cursor over an icon or element to further explain the elements or objects on the page or document(s). For example, a help feature may explain that an

excessive speed factor **922** may be programmed to a predetermined value (e.g., such as 2.0), but is thereafter reduced at a fixed or variable programmable factor based on one or more parameters. In some systems, the predetermined value is thereafter reduced by a programmable factor of 1 for every 1.5 percent of driving done at a speed over 75 miles per hour (a predetermined amount). A help feature, such as a help window **930**, may explain that a braking factor, such as an aggressive braking factor **926**, may be programmed to a predetermined value (e.g., such as 2) and thereafter is reduced at a fixed or variable programmable factor based on one or more parameters. In some systems, the predetermined value is reduced ⅛ times the number of observed, recorded, or detected aggressive braking events normalized to a per 100 miles driven basis. A help feature or window **930** may also explain, for example, that an acceleration factor, such as an aggressive acceleration factor **924**, may programmed to a predetermined value (e.g., such as 2.0), and is thereafter reduced at a fixed or variable programmable rate. In FIG. **9**, the rate may comprise a fraction (e.g., 1/14) times the number of aggressive acceleration events recorded in the device **300** normalized to a per 100 miles driven basis. In FIG. **9**, the safety score or rating may be adjusted or weighted by a function, such as the function **920** that comprises a combination of speed factors **922**, acceleration factors **924**, and braking factors **926**, or may be based on a single factor that may be a raw data element, calculated data element, and/or derived data element alone.

In FIG. **10**, a server-side scripting adds additional interactivity and customizes the viewing or delivery of documents or objects (that may updated dynamically) to render a usage discount display **1014** having a usage discount detail section **1018**. The usage discount display **1014** may also include the discount summary display **818** and a graphical operation performance section **822**. The usage discount usage discount **1022** may be a function of one or more elements. In FIG. **10** the elements include a starting discount **1024** and rating factors. The rating factors rendered in the exemplary page reflect a daytime mileage adjustment **1026**, a nighttime mileage adjustment **1028**, and a high risk mileage adjustment **1030**.

In some systems, a help feature, such as a help window **930**, may explain that the usage discount **1022** may be programmed to the value of the starting usage discount **1024**, but is thereafter reduced by one or more adjustment values. In some systems, the adjustment values may be based on daytime driving **1026**, nighttime driving **1028**, and/or a high risk adjustment **1030**. For example, a starting usage discount may be programmed to a fixed percent (e.g., 10 percent). The usage discount **1022** may be adjusted higher or lower based on one or more adjustment values. In FIG. **10**, the usage discount may be adjusted downward based on the number of annualized miles driven during the day, driven during the night, and/or classified as high risk. Daytime miles might, for example, may be miles driven between a programmed range (e.g., the hours of 5 a.m. and 10 p.m. local time). Miles driven between the hours of 10 p.m. and 5 a.m. Monday-Friday may be classified as nighttime miles. Miles driven during the hours of 12 a.m. to 4 a.m. on Saturday and Sunday might be classified as high risk miles.

A help feature or window **930** may explain that a daytime adjustment may reduce the starting usage discount by a predetermined programmable value (e.g., 1 percent for every 1000 miles driven) beyond a predetermined limit (e.g., 7250 miles per year). Miles driven during nighttime may reduce the usage discount by, for example, a fixed programmable percent (e.g., 2.5 percent for every 1000 nighttime miles driven) in excess of another predetermined limit (e.g., 250 miles). High risk miles may reduce the usage discount at a predetermined programmable rate (e.g., 12 percent per 1000 high risk miles driven).

In some pages and documents, the total discount **852** may be calculated by multiplying the usage discount **858** by the safety score **856** and adding the upload bonus **854** to that product. In other applications, the usage discount may be based on other factors and/or functions.

If the party selects or decides to provide recorded data from the device **300** to the insurer, the user may click or select the upload button **930**. The interface and preview software may server as an intermediary that transmits encrypted data from the device **300** to a server or cluster of the insurer or to a third party through a publicly or privately accessible distributed network. In some systems, the device **300** transmits encrypted data. When a data transfer is complete a party may elect (e.g., by clicking or selecting) or enable a clear logger button **1040** that directs the preview software to issue commands to erase selected recorded data from the device **300**. The device may be cleared in blocks or bytes to free up resources and allow a dynamic memory allocation process to reallocate memory to functions within the device **300**.

In FIG. **11**, a server side scripting adds more interactivity and customizes the viewing or delivery of documents or objects (that may updated dynamically) to render recorded information regarding one or more aspect of machine operation. Through these documents, a party associated with a machine may further review the data through the pages that may be served through a Web site. The Web site may transmit tools **1114** associated with files, graphical elements, and scripts that may examine how adjusting operational behaviors or characteristics may affect a cost of insurance (or a discount or surcharge on insurance) in the future or from the past. For example, the Web site may transmit dialog boxes such as text entry boxes **1118** or graphical sliders **1122** that may manipulate or edit summary information. The summary information may include information received by the insurer or the third party service provider of the insurer. A party may log in or otherwise associate him or herself with the uploaded data and summary information. The uploaded data may be preloaded into tools **1114**, **1118**, and **1122**. A usage discount summary **1126**, safety score summary **1130** and/or discount calculation **1134** portions of the Web page may be preloaded with summary information. A party may use the text windows **1118** or sliders **1120** to change the displayed performance summary information to reveal how different machine operational behavior may affect a (prospective or retrospective) cost of insurance, discount, surcharge, or coverage (not shown).

For instance, a party may change a position of an aggressive accelerations slider **1138** and observe, for instance, how reducing the number of aggressive accelerations that may occur when driving may affect a (or their) safety score **1140** and/or a discount **1142**. Similarly, increasing the number of daytime **1144** or nighttime **1146** miles driven may reveal changes in a usage discount **1126** and a calculated or total discount **1142**. Other pictorial or graphical display techniques may highlight the significance of these changes. For example, the colors of the slider **1122** or entered text **1118** (e.g., that may yield an impression characteristic) may be changed to indicate the level of risk, safety, and/or cost associated with the current or adjusted values.

In FIG. **12** a server side scripting adds more interactivity and customizes the viewing or delivery of documents or objects (that may updated dynamically) to provide a review or comparison to other parties. A party may compare one or more aspect of operation of the machine or a party's behavior to other parties and machine operations. For example, a table

1214 or graphic may compare operational aspects 1218 of the machine to historical and/or statistical data such different averages 1222.

Server side scripting customizes the viewing or delivery of documents that illustrate a speed distribution graph 1314. The speed distribution shown in FIG. 13 illustrates a percentage of time a vehicle is operated within predetermined or programmable speed ranges. In alternative pages data comparisons are provided between a user and the speed distribution of an average driver (that may have a similar or differing demographic), neighboring drivers, and other drivers of the same model vehicle or any other comparison. Information about other operational parameters may also be delivered to a user's remote interface. For example, a distribution graph displays the percentage of time a seatbelt is used, a radio is played, or a cell phone or wireless device is used or frequency (e.g., the number of times) turn signals are used per a predetermined distance (e.g., 100 miles).

Summary information about the received recorded data may be transmitted in other contexts that a user may request. For example, a distribution 1414 may be generated by a server-side script that correlates driving activity to the days of the week (FIG. 14). Additionally, or alternatively, driving activity may be correlated to a time of the day and presented in graphical format 1418. In alternative pages or documents, the data may be presented through comparisons to other machine operators or drivers. If the data is presented in comparison to neighboring drivers, the party may determine a time of day for driving when traffic is light, which may reduce the driver's level of risk.

In FIG. 15, a Web site delivers the tags, text, pictorial objects, and/or scripts that provide the exemplary summaries of machine operation in the form of a log. When summarizing a vehicle's operation, the data may comprise a trip log 1514. Asynchronous vehicle events, such as an ignition cycle, the detection of speed, or other data may identify the beginning or the end of a trip. In FIG. 15, ignition start and stop events are used to identify the beginning and the end of trips. The length of time and the number of miles driven for each trip or for the total number of trips on a given day may be tracked and transmitted to a user's remote interface. Where a fuel consumption aspect is included in the recorded data, fuel economy may be included in the trip log. When presented in a graphical format, fuel economy may be used to detect an engine, system or other failure, the onset of a failure, or to remind a user to schedule or perform preventive maintenance that may allow the user to avoid a failure.

Trip log information may assist a user account for miles driven. When used for work-related purposes, it may assist a user to account for business expenses. When delivered to a server or cluster hosted by an insurer, miles driven or the number of hours a machine is operated may be transmitted to a user's remote interface with a cost of insurance on a per trip basis. When serving a prepaid user, the server or cluster may transmit the monitored parameter (e.g., miles driven or the number of hours a machine is operated) with its associated costs (e.g., as a bill or debit from a pre-paid amount).

Some server-side scripts adds interactivity and customizes the viewing or delivery of documents or objects (that may updated dynamically) by automatically selecting and/or highlighting parameters. FIG. 16 highlights behavior or data that may increase insurance costs, such as aggressive braking 1618, aggressive deceleration 1622 events, excessive number of trips, duration of trips, distance of trips and time spent above a threshold speed 1626. The highlights may be delivered through a context-sensitive script or program that that highlights high risk parameters relevant to a user that may be based on a user and/or context (e.g., information may be highlighted if it reflects risks associated with an actuarial class). The highlights may assist a user in modifying their behavior.

A server-side scripting may add other interactivity and customizes the viewing or delivery of documents, objects, or records (that may updated dynamically) related to the device 300. A record may indicate when the device 300 was cleared 1718, when the device 300 was installed in or interfaces a machine 1722, was removed from the machine 1726 and/or when data was transferred 1730. It may allow a user to review data processed through local software (such as their preview software described in FIG. 8). It may allow a user to review a percentage of time installed parameter (e.g., 836) and/or other data retained in an interchangeable component, such as the removable storage element.

In some systems, a network connection to the insurer or a service provider may maintain the device 300. For example, software updates may be provided to the device through a Web site. If the device 300 is to be interfaced to a different machine or through a different protocol, device software may be changed to accommodate differences between machines (e.g., firmware updates). Device updates may occur through hardware changes (e.g., memory chips or cards) or through magnetic or optical media physically delivered to the party. In yet other alternatives, updates are provided through wired telephone or wireless connections to the insurer or the service provider or directly to the device itself.

The hardware, software, and scripts that allow a party to review recorded information described above is exemplary only. In some embodiments, the hardware, software, and scripts may be run on a local computing platform. In other embodiments, the software and scripts may be delivered from a remote Web site or other communications network. In still other embodiments, a party may not be able to review the recorded data. Instead, the data is provided to and processed by the insurer without review.

The device 300 may be embodied in various combinations of hardware and software. For instance, an embodiment adapted for use with factory machinery may be embodied in software that may be stored, for example, in a programmable logic controller (PLC) or supervisory computers controlling factory machinery. An exemplary embodiment 1810 of the device 300 may include a processor 1814, program storage 1818, a data log 1822, a clock 1826, an optional internal power source 1830, a machine interface 1834, and a display interface 1838. The program storage 1818 may comprise storage medium, which may be a read only memory (ROM), Electrically Erasable Read Only Memory (EEPROM), a Flash memory or other non-volatile storage medium. The program storage 1818 retains instructions for controlling or directing the processor 1814 to record one or more aspects of machine operation. The processor 1814 may process signals received through the machine interface 1834 and store information in the data log 822. In some embodiments, data may be stored in the data log 1822 with a time stamp indicating the time of day information is received, generated, or changed. In some systems, a timestamp may comprise a time value based off of the clock 1826, the vehicle, or a wireless bus or network.

In some systems, the program storage 1818 may store instructions for encrypting data. For example, data to be transmitted to an insurer or a service provider may be encrypted before or as it is being stored in the data log 1822 (or when it is transmitted to a remote destination). In some embodiments, a second (or backup) copy of the data or information may be retained in the data log 1822 using a second

layer or technique of or for encryption. A first layer or technique may be used for data to be transmitted to a user or local device or may be maintained as a backup or duplicate copy. A second layer or technique may be used for the data to be transmitted or delivered to an insurer or a third party service provider.

In some embodiments, the program storage **1818** may retain instructions for monitoring sensor output or measuring vehicle parameters (such the acceleration and/or deceleration rate of a vehicle). The device **1810** may monitor vehicle speed data (based on output of speed sensor) through the machine interface **1834**. The speed information may be processed at a synchronous rate (e.g., once per second) by the processor **1814**. The difference between consecutive speed measurements may be continuously measured in the vehicle or after the device **1810** transmits data (e.g., may comprise synchronously recorded speed) to a remote site. A positive difference between a current speed and a previous speed may indicate, for example, an acceleration event. A negative difference may indicate a deceleration event. An aggressive acceleration event may be identified when an acceleration value exceeds a programmable threshold. When analyzed in the vehicle, the rate of acceleration may be stored in the data log **1822** and time stamped (and/or date stamped) by the processor **1814**. When a deceleration rate exceeds a threshold, the rate of deceleration may be stored in the data long **1822** and time stamped (and/or date stamped) by the processor **814** when aggressive deceleration events are identified in the vehicle.

In some systems, the rate of acceleration or deceleration may not be derived in the vehicle or at a remote site. In these systems, one or more accelerometers may transmit acceleration and deceleration rates that may be processed as described above.

In some systems, the program storage **1818** may retain relationship data and instructions to preserve other data for retrieval. Program storage **1818** may direct the processor **1814** to monitor and store raw data elements (such as vehicle speed) through the machine interface **1834** at a synchronous rate. Speed and other data may be recorded, and time stamped, at a regular interval and/or upon an asynchronous event (e.g., when a speed threshold is exceeded). Other data may include trip start and stop times, device **1810** installation and de-installation times, seat belt use, turn signal use, location or route information, entertainment system use, cell phone use, tire pressure, other safety and performance parameters, and relationship data. Relationship data may comprise data that establishes a connection between the monitored or recorded data and one or more vehicle or driver characteristics. In some systems, data that establishes a connection between the monitored or recorded data and an identifier (e.g., a unique identifier to the system) or user account may comprise relationship data.

When physically connected to a vehicle, the machine interface **1834** may mate with an in-vehicle connector (e.g., an onboard diagnostic connector), such as an OBDI, OBDII and/or OBDIII connectors. Additionally, or alternatively, the machine interface **1834** may include connectors that mate with other connectors (e.g., such as those known as SAE J-1962 connectors). Furthermore, the machine interface **1834** may include electronic components that generate signals that interface the networks associated with those connectors. For instance, the machine interface **1838** may comprise electronic components compatible with a Controller Area Network (CAN) protocol, Media Oriented Systems Transport/Transfer (MOST), J1850 Variable Pulse Width (VPW), J1850 Pulse Width Modulated (PWM), Keyword Protocol 2000 (KWP2000), J1939, ISO9141, and/or protocols adopted by the International Organization for Standardization (ISO), Society of Automotive Engineers, or an automotive (in-vehicle protocols) or OEM protocol.

In some systems, an optional display interface **1838** may include one or more connector and associated electronic components for communicating with a display, computational platform, personal computer, and/or digital personal assistant. Some display devices include an RS-232 connector and/or USB connector for receiving and transmitting signals using one or more protocols. Additionally, or alternatively, one or both of the interfaces **1834**, **1838** may include wireless communication software and hardware compliant with some or all of the wireless standards described above. These interfaces may automatically identify and connect with other computers and devices.

In yet another alternative, the data log **1822** may comprise a removable storage element, such as, for example, a memory chip, card or stick, or a movable media (e.g., rotatable media), such as, for example, a floppy disk, or recordable CD or DVD. In these systems, the optional display interface **1838** may also comprise the removable storage element. The removable storage element may communicate with a display device through, for example, a memory reader or drive that transfers or copies data from the removable storage element to a display device.

In some embodiments, the device **1810** receives power from the vehicle through the machine interface **1834**. In these embodiments, the internal power source **1830**, such as, for example, a battery, "super capacitor," or capacitor, may maintain the optional clock **1826** when the device **1810** is disconnected from the vehicle. Additionally, in some embodiments, the power source **1830** may provide power to the data log **1822** for maintaining the recorded data when the device **1810** is separated from the vehicle or machine. For example, if the data log **1822** includes CMOS memory, the internal power source **1830** may serve as a battery backup for retaining the data.

In some embodiments, the device **1810** may receive power from the display interface **1838** when the device **1810** is connected to the computational platform, display, personal computer, and/or PDA. In some embodiments, the device **1810** may interface a remote clock or timing device that synchronizes to remote time signals. Time may be received from governmental or standards organizations, such as, for example, the National Institute of Standards and Technology and associated radio stations, such as WWVB, or through a wireless network. In some systems, the clock **1826** is calibrated when the device **1810** connects to a vehicle. In other embodiments, the clock **1826** calibrates when the device connects to a computational platform, display, or a network. For example, a Web page, GPS network, or wireless network may provide a timing signal that synchronizes the clock **1826**. In these embodiments, an internal power source **1830** may be used to maintain the clock between update events.

FIG. **19** is a network that may communicate with on-board portable mobile devices **300**. The host system may comprise two or more trip monitoring servers **1916** and **1918** or **1920** and **1922** (e.g., server farm or clusters) that operate and appear to the on-board portable mobile devices **300** as if they were a single unit. The clusters **1916** and **1918** or **1920** and **1922** improve network capacity through load balancers **1912** and **1914** that spread work (e.g., requests and responses) between the servers **1916** and **1918** or **1920** and **1922**. Before a request is parsed and forwarded, it must be passed through a firewall **1908** or **1910** that incorporates filters that allow or deny a request to enter or leave one or more local area networks serving the clusters. A packet filtering may be used to accept or reject packets, including the exchange of short text

messages that may be exchanged between the device **300** and the clusters **1916** and **1918** or **1920** and **1922**. Some packet filtering may accept or reject packets based on their origin or content.

To access a cluster **1916** and **1918** or **1920** and **1922**, the device **300** may access a plurality of Access Point Names (APN) **1902** and **1904** that may interface external wireless network nodes. One of many APNs **1902** and **1904** may be automatically selected based on signal strength and a series of signal exchanges that acknowledge a communication or the transfer of data without an error. The order of selection of an APN **1902** or **1904** may be based on configuration files that are automatically executed by a communication controller or by one or more processors. The configuration files may comprise files (e.g. text files, batch files) that identify the device **300** (e.g., a unique identifier) and/or control the device **300** operating behavior. Commands or priorities in the configuration files may enable or disable features, set limits on resources (e.g., memory allocations, number of sensor outputs that may be monitored, etc.) and extend the functions of the device **300**. Device extension may occur by loading device drivers that control or support hardware specific to the device **300** or to a customized use (e.g., monitor specific outputs, derive specific elements, enable or drive an audio, text, and/or video transmission, transmit in a selected wireless protocol, etc.). An exemplary configuration file may be created or modified by an insurer or third party (e.g., in other versions, by the operating system at system installation) at any time, and contain commands that configure the system to establish monitoring (e.g., sample frequency, storage frequency, error tracking, etc.,) and/or communication (e.g., sequential protocol detection, network selection, connection conditions, network connection frequencies, file formats, signal monitoring, transfer protocols, etc.).

System installation may set up applications in the device **300** to monitor a vehicle **1902** or **1904** and communicate with remote destination(s). When a voltage threshold is detected or reached (or the unit **300** identifies the desired vehicle), an initialization file containing information about the initial configuration of the device **300** may be executed by a communication controller or one or more processors of the device **300**. The initialization file may include commands that determine the source and transmission protocol of the physical or virtual in-vehicle data bus. In-vehicle bus protocol may be identified through a sequential handshake. The device **300** may cycle through a plurality of protocols by transmitting requests in different protocols while waiting for a valid response. When a valid response is received, the communication controller or processors may store the identity of the validated protocol (or if more than one protocol is used, store the identity of the valid protocols) in a cache or a non-volatile memory and loads software routines (or a Basic Input/Output System, BIOS, from a non-volatile to an operational memory) that support data transfer or exchanges between the device **300**, the vehicles **1902** and **1904**, and input/output nodes. Some devices **300** may synchronize an internal timing device or clocks to an in-vehicle clock. In other devices **300**, clock synchronization to the vehicle does not occur when the internal timing devices synchronizes to local time maintained on the out of vehicle networks (e.g., external networks).

When a connection is established between the device **300** and the in-vehicle data bus, the initialization file may request vehicle attributes and manufacturers' data. Some systems may request Vehicle Identification Numbers (VIN) through the in-vehicle bus. A VIN may establish a manufacturer, assembly location, and vehicle characteristics, such as the engine, transmission, differential ratio, year, make, model, and/or a unique vehicle identifier of that vehicle. The initialization file may also establish other defaults and/or user preferences that may be edited, modified, or updated by the operating system or through software releases and/or updates from the insurer or third party.

Before a device **300** initiates a connection with an external network and then a session with a content provider (e.g., an insurer or third party), it may select between multiple wireless nodes. In some cellular applications, one or more nodes may support a Wireless Application Protocol APN and other node(s) may support a World Wide Web APN. The Wireless Application Protocol APN may provide access to known destinations and/or information services provided to the users of that proprietary network. World Wide Web APN may provide access to known destinations and any content (or server) accessible through a publicly accessible distributed networks like the Internet.

Upon an initialization event, after a synchronous period (e.g., after a predetermined time such as twenty-four hours from a plug-in event), and/or an asynchronous event (e.g., a trigger event), a wireless connection may be made and a session established between the device **300** and the external wireless network. When established, the device **300** may synchronize its internal timing device or clock (e.g., time of day, date, and/or month) to the time, date, and/or month maintained by the external network. In some networks, including cellular networks, data exchanges may occur through wireless control protocols, wireless encryption protocols, and/or other communication protocols. Wireless control protocol and a wireless transaction facilitator may control the communication throttle (e.g., transmission rates across the network) based on the available bandwidth of the network. Programming and instructions stored in non-volatile memory (e.g. firmware) may be updated through a wireless control protocol and/or a wireless transaction facilitator.

A dynamic memory allocation processor or a dynamic memory allocation process may allocate memory to maintain existing firmware (e.g., a legacy version that may include startup routines, input/output instructions, etc.) when updated firmware is transferred to the device **300** through a physical or virtual link. If a device self-diagnostic or an error-detection coding detects an error during storage or transmission, the legacy firmware may be automatically restored and the device **300** may be reset to the preferences and defaults observed before the unsuccessful update. When an error correction coding is used, a detection and correction of errors may be made during the transfer or installation of the firmware to assure an error-free version is stored or installed within the device **300**. The update may be installed or the legacy firmware sustained before the memory allocation processor or the dynamic memory allocation process de-allocates the memory retaining the uninstalled or inactive version of the firmware to free the previously allocated memory.

An APN selection may select one of two private front end branches that comprise substantially similar or identical processing functions in FIG. **19**. Firewalls **1908** and **1910** allow or deny entry to or exit from the local area network. Load balancers **1912** and **1914** pass commands, firmware, and/or data between two or more trip monitoring servers **1916** and **1918** or **1920** and **1922** (e.g., to improve throughput and response times). The servers **1916-1922** may support wireless control protocols (e.g., a Web service), wireless encryption protocols, a wireless transaction facilitator, a Short Message Service (e.g., a Web service that may support up to about 160 characters) and other communication facilitators and protocols. The device **300** and servers **1916-1922** may be File Transfer Protocol compliant to support the download firm-

ware to or upload files from the device **300**. Firewalls **1924** and **1926** may secure the middle tier and backend networks shown in FIG. **21** from the front-end networks shown in FIGS. **19** and **20**.

A client may access a similar network of firewalls, load balancers, and servers **2008-2026** shown in FIG. **20**. Through a publicly accessible distributed network **2006**, distributors **2002**, customers **2004**, and other authorized users may transmit requests, and receive, parse and render responses from an on-line services cluster **2016** and **2020** (that may communicate through Web services) and/or Trip monitoring servers **1916-1922**. Some response may include scripts that display responses in a common window where the request originated or in a different window. Some presentation choices may be made by the user, by a selected link, or may be made as a result of a response as described through this written description. Some responses contain scripts that may cause an output to be rendered in a different visual window. In some instances, such as when output highlights safety or cost content, a separate visual window may be rendered to attract the user's attention or focus. The impression characteristic of a response (e.g., choice of fonts, color, graphics, positions, animations, styles, etc., may indicate a designator of source) may be selected by or tailored to a sender's desired format at the server-side (e.g., through an active server page).

Two or more application servers (e.g., clusters) **2102** and **2106** may reside in the middle-tier of the server centric architecture. The servers **2102** and **2106** may provide middleware service for security and maintenance. In FIG. **21**, the application servers **2102** and **2106** are wireless transaction facilitator and device data transform compliant. In some systems, the middle tier servers **2102** and **2106** may comprise batch servers serving as a first location in which the raw data elements, calculated data elements, and/or derived data elements may be temporarily stored, locally or across a distributed storage devices or database(s) **2108**. For longer term storage or data analysis, data may be retained in database(s) **2108** and **2114** (e.g., relational databases that may comprise one or more flat files (2-dimensional arrays) that may be transformed to form new combinations because of relations between the data in the records or other databases, such as hierarchical databases that retain searchable indices that reference distinct portions within that database and/or other storage devices or databases accessible through an archive file server **2104** and/or a database management server. A parallel database system (not shown) may be accessed by one, two, or more processors that may service database management requests, such as structured query language, transaction logging, input/output handling, and data buffering. It may provide quick access to databases across multiple storage devices.

While a data warehouse may be distributed across several servers and may contain several databases and information from many devices in multiple formats, it also may be accessible through a backup server **2112** as shown in FIG. **21**. Access to the data warehouse **2114** may be transparent to the user, who may use commands to retrieve and analyze all the data, details, metadata, summaries, etc. The data warehouse **2114** may include data about the organization of the data warehouse **2114**, where the data or information may be found, sources of the data, and any relationships that have been automatically or manually established between data.

FIG. **22** is a high level view of an alternative risk management system **2200** that may communicate with the device **300** through a wireless medium. The device **300** may communicate with an insurer or other entity (through a publicly accessible or privately accessible distributed network) through transceivers (e.g., transmitters or receivers), antenna signaling controllers and base station controllers. Some exemplary communication may occur because of a:

Call Reason	Description
Schedule	Through the configuration file, the device 300 may call at synchronous intervals (e.g., a programmable or repeatable period) and/or after asynchronous events (e.g., after each "trip," after a number of "trips," etc.).
Short Message Service Page	A non-speech alert received from an insurer or other entity.
Device Failure	A hardware and/software failure occurs.
Memory Threshold	Memory use approaches or exceeds a programmable threshold (e.g., a percentage of a capacity).
Power-up	When the device 300 receives power.
First Detection of Protocol	After device initialization (e.g., source voltage exceeds a programmable threshold, a vehicle is detected, a vehicle protocol is detected, etc.).
Speed Delta Threshold	For a fixed or variable programmable period, a difference in sequential speed readings exceeds a programmable threshold.
International cell	The device locks to or interfaces an "international" cell or wireless site.
Callback	If a call is interrupted or the device 300 may terminate communication to respond to a request (e.g., install a firmware upgrade). The device 300 may report the status of the last command the device 300 executed during the subsequent communication or later call.

Information that may be transmitted through the wireless medium to an insurer or other entities (such as their Web site or private server or cluster) may include:

Parameter	Description
Identifiers	A wireless network identifier (e.g., may be retained in a portable subscriber identity module within the device 300 that identifies a unique user account to a wireless network, may handle device 300 authentication, and may provide data storage)
Firmware Versions	May include version numbers of one or more processors, firmware, wireless or cellular site protocol, vehicle protocol, and/or GPS versions, etc.
Vehicle Protocol	The protocol the device 300 uses to communicate with the vehicle.
Vehicle Identification	Vehicle Identification Number
Mileage	Distance traveled (e.g., may comprise an end of a trip odometer reading or a discrete measure of distance a user may travel for each trip).
Memory Use	Memory currently in use.
Call Reason	Why a device 300 is communicating with the insurer or other entity
Signal Strength	Magnitude of a desired electric field at a reference point.
Trip Identifier	A marker of some type (e.g., a flag) that identifies when a vehicle's engine is started.

A list of some of the commands that an insurer or other entity may send to the device **300** and some of the expected results may include:

Command	Result
Upload (!UL)	The device 300 may transmit complete trips and events recorded by the device 300 since a last

-continued

Command	Result
	memory clear command was executed. The data may include a calculated value to test data (through a sequential combination) to detect errors during transmission and/or storage. Some systems data may be encoded through an error-correction encoding that allows the detection and correction of errors that may occur during transmission.
Update (!UD)	The device 300 may be given a type and filename for firmware and/or configuration files(s) that may be downloaded into the device 300. Through some update processes, the device 300 may disconnect from content or other provider (e.g., an insurer or other entity) and connect to another server to download the firmware and/or configuration files to update the device 300.
Run Diagnostics (!DG)	Initiates one or more diagnostic tests that one or more processors may perform (e.g., a main processors, wireless processors, vehicle interface processors, and/or GPS processor, etc.). If requested, the success or failure may be transmitted to the insurer or entity.
Memory Clear (!MC, !MC0, !MC1, !MC2)	The memory clear commands clear the content retained in local memory of the device 300. Some commands will restore the device 300 to a default others may clear memory to different initialization levels (e.g., !MC may clear only existing trip data).
Reset (!RS)	Resets the device 300. If a multiprocessing architecture, parallel processing architecture, coprocessor architecture, or modular architecture is used in the device 300, a rest command may reset each or selected processors or modules.

When an upload command is received, the device **300** may transmit information to a destination (e.g., an insurer or entity). Each response may be unique to a request. Some of the information that may be transmitted by the device **300** may include:

Information	Description
Upload date and time:	The date and time the device started the upload to insurer or entity. (Always provided in some applications).
Trip start time:	The date and time that a trip was started. (Only provided if a trip has been made since the last memory clear in some applications.)
Duration and speed:	For each duration, (e.g., may be configured for a synchronous interval, e.g., about every 1 second) the speed in kilometers (or miles) per hour.
Trip end time:	The date and time that a trip ended. (For each trip stored in local memory, the information may include a trip start value, trip details, and a trip end value in some applications)
Connect event:	The date and time the device 300 was connected to the vehicle. This is when the device gets power from the vehicle or is in communication with the vehicle. (May be recorded once until the next memory clear command is received in some applications.)
Disconnect event:	The device 300 may record a date and time stamp with the stored data at synchronous intervals (e.g., a predetermined time period such as every 5 minutes). The time stamp may be stored in non-volatile memory (e.g., flash memory) when the device is in communication with the vehicle, receives power from the vehicle, an ignition or speed event is detected, etc.
Protocol event:	The protocol that the device 300 is using to communicate with the vehicle. (In some applications, this event may only occur after the first ignition cycle or the starting of the vehicle and may be cleared when a memory clear command is received).
Specific events:	A - Processor-version, On Board Diagnostic-version, Global Positioning System-version B - Wireless (e.g., cellular) connection failure C - Data connection failure on wireless network D - Unable to contact destination E - Firmware, software, and/or configuration file(s) access failure F - Checksum failure (e.g., firmware, software, configuration files, etc.) G - Network "roaming" H - Memory threshold event I - Unknown trip log file entry J - Unknown event log file entry K - Number of records transmitted not equal number of records stored L - Battery voltage exceeds alternator threshold, in-vehicle communication enabled M - In-vehicle communication terminated due to an ignition off event

The parenthetical information included in the table above reflects exemplary guidelines that enable an efficient exchange of data and/or software. The frequency at which information, data, etc., and inclusion of objects will change in alternative implementations.

In some systems, the following settings may be configured in the device **300**.

Setting	Description
Profile Name	The name of this configuration file reported when the device 300 calls or transmits to a destination.
Checkin Interval	The number of hours the device 300 should wait until it calls a destination for a scheduled call. A predetermined value (e.g., of "0") may indicate the device 300 should call the destination after a trip has been completed.
GPRS Retry Count	Number of times the device 300 should try to connect to a destination if a communication failure occurs.
GPRS Retry Pause	The amount of time (e.g., number of minutes) the device 300 should wait before retrying to connect to destination
Port Read Frequency	The amount of time (e.g., number of seconds) the device 300 should read information during a trip.
PortRead Multiple	Based on the above Port Read Frequency, how many samples should be stored in memory for the trip.
Speed Threshold	Speed in kilometers (or miles) per hour; the device 300 may use this parameter to initiate call home event.
On Net MCC/MNC	Defines up to a predetermined number (e.g., 10) of networks that may be considered "non-roaming" networks.
Apply OnNet	For each call to a destination, represents the number of times the device 300 may call a destination if roaming.
APN	Up to a predetermined number (e.g., 10) of APN or wireless nodes the device should cycle through when attempting to connect to a wireless network (e.g., a cellular network).
WCP Name	The domain name service that should be used to contact the Wireless Communication Protocol server or other server to reach a destination.
WCP Port	What Transmission Control Protocol/Internet Protocol port that may be used for communications.
FTP Name	The domain name service name for the FTP server at the destination used to download firmware and/or configuration files.
FTP Username	Username to login to the FTP Server
FTP Password	Password to login to the FTP Server
FTP Directory	The directory that the files are located

A block diagram of an alternative on-board portable mobile device **300** that may communicate with in-vehicle local processor(s), controller(s), and/or directly with sensors is shown in FIG. **23**. The device **300** may store executable programs, configuration files, and vehicle based data. The

data may include raw data elements, calculated data elements, derived data elements, and/or subsets of these elements.

In FIG. **23**, the usage based monitor or device **300** comprises two or more processors that execute multiple tasks (through programs or instructions sets) in tandem. Each processor may work on a different instruction set or different part of the common process of monitoring vehicle operation and/or driving behavior. While the functions assigned to each processor may occur dynamically (assigned by the main processor **2302** and software), in FIG. **23** the functions are preassigned. The processors **2302-2308** share a local and/or distributed memory **2310** and **2316** and an input/output bus or data path. In some systems, the device **300** may have an asymmetric like architecture.

A single copy of the operating system and configuration file(s) may coordinate program execution in the device **300**. In alternative devices **300**, each processor may have its own operating system and/or memory, and in some cases, share memory and interconnected data paths used to exchange data, receive firmware, or configuration files. The coordinated processing of the architecture increases speed or computing power, like a parallel processor or co-processor architectures used in other alternative devices **300**.

To monitor vehicle operation or driver behavior, a main processor **2302** may coordinate the wireless processor **2304**, in-vehicle communication processor **2306**, and optional location processor **2308**. In some devices **300**, the main processor **2302** may access the entire memory map and execute applications in support of its input and output nodes. The input/output nodes may include an optional video **2312** node, audio node, and/or tactile node **2314** that transmit video, sound, and output perceptible to a sense of touch, respectively. The transmitted media may be transmitted directly to a user or conveyed through an in-vehicle system (through in-vehicle amplifiers and loudspeakers, for example).

In FIG. **23**, the main processor **2306** and/or firmware may offload an out-of network communication component to the wireless microprocessor **2304**. The wireless microprocessor **1204** and transceivers **2318** may be compliant with one or more wireless protocols that include the transceiver protocols described above. In some systems, the wireless microprocessor **2304** may comprise a single-chip cellular (or wireless) baseband processor that may be GSM ("Global System for Mobile Communication" that may include enhanced data rates for GSM Evolution (EDGE)) and/or GPRS (General Packet Radio Service) and/or CDMA (Code Division Multiple Access) compliant. Some single-chip cellular processors include a power amplifier controller and speaker-phone/car-phone audio circuitry that may drive the audio output **2314**. Some of the single-chip cellular processors contain all analog and digital GSM, CDMA, and/or multi-slot GPRS baseband processing functions within the single chip. Interface software, circuitry, and drivers are integrated in the single-chip cellular (or wireless) processor to enable auxiliary components, such as microphones, loud speakers, display devices or screens, keypads, data terminal equipment and SIM modules (or other memory modules) to connect directly to the wireless microprocessor **2304**. A flexible baseband control interface supports a wide range of transceivers, including GSM850, E-GSM900, GSM1800 and GSM1900 frequency bands.

In-vehicle communication may be offloaded to the in-vehicle processor **2306** and transceivers **2318** that may include one, two, or more embedded antenna element(s). The embedded antenna element(s) may be configured and mounted such that a portion of an upper surface, adjacent surface, or an entire upper or adjacent surface of the device **300** may be part of the radiating element (and/or the receiving element). In alternative systems, the antenna element is configured and mounted such that, once the device **300** is fully assembled, the device case itself or portions of it may be used as part of the radiating and/or receiving element. In some systems, the embedded antenna may utilize integrated circuit board designs and connecting links without additional parts. Since some embedded antenna elements are not be buried or embedded between other circuits in some alternative devices, these antenna elements may better control radiation patterns. The in-vehicle processor **2306** and transceivers **2318** may be compliant with one or more in-vehicle communication standards that may include the in-vehicle protocols described above. An optional navigation component may be offloaded to a location processor **2308** (or global positioning processor). The location processor **2308** may be compliant with one or more navigation protocols that may include the location protocols described above.

FIG. **24** is an initialization process **2400** that may be implemented through an initialization file. The initialization file may include the hardware configuration information necessary to interface a vehicle and information about the initial configuration of device-based data exchanges. At **2402** and **2404** a vehicle voltage is detected and compared to a programmed threshold (e.g., falls below a threshold in alternative devices **300**). When the vehicle voltage exceeds the programmed threshold, a request is transmitted at **2406** across a vehicle bus while waiting for a response at **2408**. When a valid response is not received, the process repeats the cycle by sequentially transmitting signals in different vehicle bus protocols at **2406** and **2408**. A response may be compared against a list of valid response, and if the process detects a match at **2408**, software that supports data transfer or exchanges between the device **300**, the vehicle, and a remote destination is loaded into operating memory. With a validated response, vehicle attributes and manufacturers' data requests are transmitted across a vehicle bus. Defaults and/or user preferences within the device **300** may be established.

FIG. **25** is a process **2500** in which a device **300** transfers data to a destination. The destination may be associated with an identifying number or may be contacted by specifying or detecting a communication protocol. The data migration from the device **300** to the destination (e.g., an insurer's or entities privately or publicly accessible site) begins when data is not being recorded (e.g., in other devices **300**, data transfer may occur at anytime). That may occur at the end of a trip at **2502** and **2504**. The process **2500** may automatically cycle through a programmable number of APNs or wireless nodes as the process attempts to connect to a wireless network at **2506** and **2508**. If a connection fails, an error is stored at **2510** while the process waits to monitor additional data or reconnect to the network at **2502** and/or **2506**. When a connection occurs, the process **2500** transmits an identifier to the network that identifies a unique user account. The identifier may include a device **300** authentication.

When a connection is established and a destination acknowledged at **2508**, automated scripts or programs may attempt to transfer data from the local memory of the device **300** to a remote memory at a destination (e.g., such as an insurer or other entities' site) at **2512**. In some processes, a method encodes data before the transfer so that errors that may occur during storage or transmission of the data may be detected (e.g., error-detection coding). In alternative processes, the method encodes the data before the transfer to allow for the detection and correction of errors that may occur during storage or transmission (e.g., error-correction coding). Error codes that correlate to a fault (e.g., error codes that may

identify corrupted data, failure to contact a destination) may be stored locally or at the destination and a diagnostic test performed at the request of the destination (e.g., the insurer's or entity). If a data migration is successful, a memory clear command may be received from the destination that directs the device **300** to clear some or all of the local memory at **2514**.

An exemplary record that may be transferred to an insurer's or other entities destination may look like the text file shown in FIG. **35**. The data may comprise a single file with the more recent entries appended to the end of the file or separated into distinct files (such as an operational log, an error log, trigger log, etc.) that includes user specific information. A device log analyzer that may be resident to or distributed across the application servers **2102** and **2106** and/or archive servers **2104** of FIG. **21** may parses the log files and derive indicators about vehicle operation, driving behavior, or other usage based metrics. Documents and/or reports may be transmitted to remote interfaces. Alternatively databases or database management servers may parse the log files, derive indicators, and in some systems generate reports through server-side scripts. The exemplary pages of FIGS. **9-17** and **30-34** may be derived by device log analyzers and/or database management servers. An exemplary explanation of the entries shown in FIG. **35** explains that

Entry	Description
U,89014104211472857203,2008/04/01,16:16:00 (Name of transferred file)	
89014104211472857203	A unique user account to a wireless network that may handle device authentication
2008/04/01	Date the log was uploaded
16:16:00	Time the log was uploaded
H,2008/04/01,16:09:01 (Header)	
2008/04/01	Date trip was started (e.g., date/time based on wireless network)
16:09:01	Time trip started
D,1.000,10 (Detailed record: time & speed)	
1.000	Frequency in time (seconds) from last monitored parameter (e.g., speed)
10	Speed value (e.g., raw data element in kilometers per hour)
T,2008/04/01,16:15:21 (Trailer record identifying the end of a trip)	
2008/04/01	Date trip was ended (e.g., date/time based on wireless network)
16:15:21	Time trip ended
X,7,E,832,2008/04/01,16:09:00 (Found Battery voltage above alternator threshold)	
832	Measure of battery voltage
2008/04/01	Date of measurement
16:09:00	Time of measurement
X,7,D,0,2008/04/01,16:15:38 (Disabled communication after communication stopped due to an ignition off event)	
2008/04/01	Date when communication was disabled
16:15:38	Time when communication was disabled
X,7,E,744,2008/04/01,16:15:41 (Found Battery voltage above alternator threshold)	
744	Measure of battery voltage
2008/04/01	Date of measurement
16:15:41	Time of measurement
X,1,0102A,7203,006f,0001 (Versions & identifiers)	
0102A	Main microprocessor version
7203	Wireless microprocessor version

-continued

Entry	Description
006f	In-vehicle communication identifier
0001	Global Positioning Sensor version

When a trigger event occurs, a connection through a wireless network is made and an interactive session begins with an entity or insurer at **2502-2508** or an error logged at **2510**. In FIG. **26**, a trigger event may direct the destination to perform an action. The trigger event may be automatically evaluated at the destination (and in some alternatives, by the device **300**). In some circumstances additional data or information may be needed. When needed, the destination may issue a command that causes the device **300** to receive, parse, process a request, and transmit a reply at **2616** (if resolved locally, cause the device to harvest additional information). If the trigger event relates to a safety concern, the destination (or device **300**) may automatically seek assistance by sending a message or another alert to a call center, medical center, technical center, or initiate another action. If a trigger event relates to an operational concern, the destination may issue diagnostic or repair commands or firmware updates that may diagnose or repair the device **300** (and/or vehicle in alternative processes).

When no activity is detected through an in-vehicle bus or out of vehicle network or motion or changes in engine load are not detected (e.g., through a motion sensor, manifold absolute pressure sensor, or another sensor that may detect changes in engine load or speed), the device **300** may reduce power consumption by powering down the physical-layer circuitry to enter a sleep mode at **2702** of FIG. **27**. When an in-vehicle or out-of vehicle activity or request is detected, the device **300** may automatically negotiate the connection if it is available. To reduce battery drain, the transmission rate may be automatically reduced to link to a predetermined transmission rate when on battery power (whether it be from the vehicle and/or device **300**). This power management characteristic may comprise a built-in power management feature of the device **300**. If a connection to a destination is sought, a network connection may be established at **2506-2508** and data transmitted at **2512**, a text message sent, or an error logged at **2510**. If a connection to the vehicle bus is sought (e.g., when an activity is detected) the device **300** may negotiate a connection through the vehicle bus.

A device **300** may receive firmware, configuration files(s), and other updates that may be received from a destination associated with an insurer or entity such as a vendor as shown in FIG. **28**. When an update is sought, a network connection may be established at **2506-2508** or an error logged at **2510**. A dynamic memory allocation process may allocate additional memory from a device heap (e.g., memory reserved for program or temporary data storage use) before receiving an update. Existing firmware, configuration files, and other files (e.g., legacy versions) may be retained before software, data, or other files are transferred from a destination to the device **300**. The transfer of software, data, or other files may fail. If that occurs, the update process may repeat a predetermined number of cycles (e.g., three or more, for example) at **2804-2810**. When the error cannot be corrected the legacy versions may be automatically restored and the device **300** may be reset to the preferences and defaults observed before the unsuccessful update. The error may be logged and the dynamic memory allocation process may de-allocate the memory retaining the uninstalled versions from the heap to free some allocated memory. If a device self-diagnostic, an error-detection coding, error-correction coding, or other

method confirms or establishes a successful transmission and storage or fails to identify an error, the updates may be installed and the memory allocation process may de-allocate the memory retaining the legacy versions.

The methods and descriptions of FIGS. **1**, **5**, **6**, **7**, and **24-28** may be encoded in a signal bearing medium, a computer readable medium or a computer readable storage medium such as a memory that may comprise unitary or separate logic, programmed within a device such as one or more integrated circuits, or processed by a controller or a computer. If the methods are performed by software, the software or logic may reside in a memory resident to or interfaced to one or more processors or controllers, a wireless communication interface, a wireless system, a powertrain controller, an entertainment and/or comfort controller of a vehicle or non-volatile or volatile memory remote from or resident to a the device **300**. The memory may retain an ordered listing of executable instructions for implementing logical functions. A logical function may be implemented through digital circuitry, through source code, through analog circuitry, or through an analog source such as through an analog electrical, or audio signals. The software may be embodied in any computer-readable medium or signal-bearing medium, for use by, or in connection with an instruction executable system or apparatus resident to a vehicle or a hands-free or wireless communication system. Alternatively, the software may be embodied in media players (including portable media players) and/or recorders. Such a system may include a computer-based system, a processor-containing system that includes an input and output interface that may communicate with an automotive or wireless communication bus through any hardwired or wireless automotive communication protocol, combinations, or other hardwired or wireless communication protocols to a local or remote destination, server, or cluster.

A computer-readable medium, machine-readable medium, propagated-signal medium, and/or signal-bearing medium may comprise any medium that contains, stores, communicates, propagates, or transports software for use by or in connection with an instruction executable system, apparatus, or device. The machine-readable medium may selectively be, but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, device, or propagation medium. A non-exhaustive list of examples of a machine-readable medium would include: an electrical or tangible connection having one or more links, a portable magnetic or optical disk, a volatile memory such as a Random Access Memory "RAM" (electronic), a Read-Only Memory "ROM," an Erasable Programmable Read-Only Memory (EPROM or Flash memory), or an optical fiber. A machine-readable medium may also include a tangible medium upon which software is printed, as the software may be electronically stored as an image or in another format (e.g., through an optical scan), then compiled by a controller, and/or interpreted or otherwise processed. The processed medium may then be stored in a local or remote computer and/or a machine memory.

When a device initiates a session with a destination (e.g., an insurer or other entity such as a data repository or other content providers) in FIG. **29**, it may send and receive discrete digital information such as objects through a wireless network. Objects may be received in real-time or after some delay by the input and output nodes that may interface one or more devices **300** at **2902-2906**. Firewalls allow or deny entry or exit from the local area or distributed network at **2908**, **2922**, and **2926**. A correlation analysis, inference programs or engines, insurance computational programs, data modeling, or other statistical analysis may evaluate or assign a level of risk, insurance scores, safety scores, and/or rating factors at **2910-2914**. The level of risk scores or factors may be based at least in part on the raw data elements, calculated data elements, derived data elements, and/or other objects received from the device **300**.

A quote, cost (e.g., an amount due or bill), or adjustment (e.g., cost, term, or some other parameter) may be derived at **2916**. While the quotes, costs, and adjustments may comprise a fixed value, in alternative systems the value may comprise a fluid range that may vary by user, a user's behavior, or by an insurance parameter (e.g., an actuarial class). Distributed databases **2918** may store the quotes, costs, adjustments, raw data elements, calculated data elements, derived data elements, assigned levels of risk, insurance scores, safety scores, rating factors, and/or other objects.

In some systems like those shown in FIG. **29**, one or more or of the collective, distributive, or discrete databases may manipulate information in a way a user may find logical or natural to use (e.g., an intelligent database). Intelligent database searches may rely not only on traditional structured query language data-finding routines, but also rely on predetermined rules governing associations, relationships, and/or inferences regarding the data that may be established by the destination (e.g., the insurer or other entity) and that may be retained (e.g., stored) in the database.

Clients or internal users may access the local area or distributed network through firewalls **2926** and **2922**, load balancers (not shown), and server clusters **1916**, **1918**, **2016**, **2020** shown in FIG. **29**. Through publicly accessible or privately accessible distributed networks, distributors, customers, vendors and other authorized users may transmit requests, and receive, parse, and render responses from clusters of on-line services **2106** and **2020** (that may communicate through Web services) and/or Trip monitoring servers **1916-1922**.

An information management resource management server (or service within an on-line server) may manage the resources for collecting and delivering content from a destination to the user. The information management resource management server may serve dynamic resources (through an active server side platform) or static resources such as the risk classification page shown in FIG. **30**. Other exemplary content that may be delivered to a remote interface is shown in FIGS. **31-34**. In FIGS. **31** through **33** a speed is graphically presented. The continuously plotted speed versus time data may provide immediate feedback about the length of time a driver may have been on the road, the driver's continuous speed, and its effect on fuel economy. The level of detail or resolution (compare FIGS. **31** to **32**) delivered to a remote interface may be automatically customized to the content delivered to a remote interface to highlight the significance of certain high risk behavior such as driving at excessive speeds.

Additional trip details may be accessed by user activated links that may lead the user to other content such as a trip log. The trip log may provide details that may be sorted or searched and viewed. The exemplary log shown in FIG. **34** provides a chronological record of activities that may enable trip reconstruction or examination of a sequence events and/or changes. The record of events may include the number of trips made on a given date, a pictorial or textual based risk assessment, a measure of drive time, time spent driving at or over a predetermined velocity, mileage, and/or a measure of risk events. In FIG. **34**, a sudden acceleration or braking may suggest an aggressive or unsafe driving behavior.

Other alternate systems and methods may include combinations of some or all of the structure and functions described above or shown in one or more or each of the figures. These

systems or methods are formed from any combination of structure and function described or illustrated within the figures. Some alternative systems or devices compliant with one or more of the transceiver protocols may communicate with one or more in-vehicle displays, including touch sensitive displays. In-vehicle and out-of-vehicle wireless connectivity between the device **300**, the vehicle, and one or more wireless networks provide high speed connections that allow users to initiate or complete a transaction at any time within a stationary or moving vehicle. The wireless connections may provide access to, or transmit, static or dynamic content (live audio or video streams, for example). The content may include raw data elements, derived data elements, or calculated data elements (e.g., vehicle-related data). Other content may be related to entertainment and comfort, or facilitate electronic commerce or transactions. Some devices **300** allow users to amend or enter into insurance policies through the wireless connections of the vehicle or the wireless processor **2304** of the device **300**. Some devices **300** may provide turn-key access to insurance coverage to new vehicle buyers before the vehicle leaves a sales lot. The interoperability of some devices **300** to in-vehicle networks and external wireless protocols allows some devices **300** to provide primary or back-up functionality to in-vehicle equipment, including OEM and/or aftermarket equipment.

Other alternative systems facilitate device **300** recovery. When a disconnection event occurs or an unexpected motion is detected, some devices **300** may initiate an asynchronous or periodic communication with a remote destination, like a control center or another device **300**. The device **300** may communicate raw, derived, or calculated data elements including a current location of the device **300**. The location may be provided through a radio-navigation system such as a global positioning system, for example. In some applications, devices **300** may monitor real-time traffic conditions. Through synchronous or asynchronous communications, the devices **300** may transmit speed and location readings to a remote destination (e.g., a central control). The remote destination may retain data that may create a real-time picture of traffic speeds, travel times, and/or other travel/road conditions. When compliant with a mesh network, some devices **300** may generate these profiles in areas where wireless service is unavailable. Some devices **300** not only conserve power, but also conserve bandwidth by not moving data continuously across a persistent network. Instead, data is moved across stationary or non-stationary nodes (e.g., a device **300**) across relatively short distances until a wireless network transceiver or destination is reached.

While various embodiments of the invention have been described, it will be apparent to those of ordinary skill in the art that many more embodiments and implementations are possible within the scope of the invention. Accordingly, the invention is not to be restricted except in light of the attached claims and their equivalents.

What is claimed is:

1. A system that monitors and facilitates a review of data collected from a vehicle that is used to determine a level of safety or cost of insurance comprising:

a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle;

a memory that stores selected vehicle data related to a level of safety or an insurable risk in operating a vehicle;

a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network and a server;

a database operatively linked to the server to store the selected vehicle data transmitted by the wireless transmitter, the database comprising a storage system remote from the wireless transmitter and the memory comprising records with operations for searching the records and other functions;

where the server is configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects a premium of an insurance policy, safety or level of risk; and

where the server is further configured to generate a rating factor based on the selected vehicle data stored in the database.

2. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** where the wireless transmitter is configured to transfer the selected vehicle data retained within the memory through a pulse position protocol without varying the power level or phase of a transmitting signal.

3. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** where the wireless transmitter is compliant with a wireless transaction facilitator that throttles the transmission rates across the wireless network based on an available bandwidth of the wireless network.

4. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** further comprising a dynamic memory allocation processor that allocates a portion of the memory to retain a copy of a legacy version of firmware that comprises input/output instructions when an updated firmware is transferred to the memory through the wireless network, the dynamic memory allocation processor de-allocates the portion of the memory when an error-free version of the updated firmware is stored or installed in the system or when a copy of the legacy version of the software is restored to control the processor of the system.

5. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** where the wireless network comprises a mobile broadband communication network that provides full data exchange mobility up to vehicle speeds of about 100 miles per hour.

6. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** where the wireless transmitter is compliant with two or more multiple packet architectures that are automatically detected and one or more multiple packet architectures that are automatically selected when a series of signals acknowledge that a communication or transfer of information or data may occur.

7. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** where the wireless transmitter is responsive to an in-vehicle event-driven request to transfer the selected vehicle data retained in the memory to a remote server when the wireless network indicates an available channel capacity to transfer the selected vehicle data across the wireless network.

8. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** further comprising a receiver tuned to receive continuously transmitted trilateral encoded signals through a bandwidth that is separate from the wireless network.

9. The risk management system of claim **1** where the processor, the memory, and the wireless transmitter are in communication within a portable device.

10. The risk management system of claim **1** where the wireless transmitter comprises a single-chip cellular baseband processor.

11. The risk management system of claim **10** where the single-chip cellular baseband processor is Global System for

Mobile Communication compliant, Code Division Multiple Access compliant, or General Packet Radio Service compliant.

12. The risk management system of claim **10** where the single-chip cellular baseband processor is Global System for Mobile Communication compliant and General Packet Radio Service compliant.

13. The risk management system of claim **10** where the single-chip cellular baseband processor comprises integrated interface drivers that enable auxiliary components comprising loudspeakers, display, and memory modules to connect directly to the single-chip.

14. The risk management system of claim **1** where the wireless transmitter comprises an embedded antenna element adjacent to the processor and the memory.

15. The risk management system of claim **14** where the embedded antenna element comprises a circuit board element.

16. The risk management system of claim **1** where the wireless transmitter is further configured to respond to a trigger event by transmitting an alert to a third party when a driving incident occurs.

17. The risk management system of claim **16** where the driving incident comprises exceeding a speed threshold, traveling outside of a designation, or a lock out condition.

18. The risk management system of claim **17** where the wireless transmitter comprises a transceiver configured to receive a communication from a third party and the alert comprises a text or an aural message.

19. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** where the server is further configured to calculate an insured's premium under the insured's insurance policy based on the rating factor, or a surcharge or a discount to the insured's premium, based on the rating factor.

20. The system that monitors and facilitates a review of data collected from a vehicle of claim **1** where the server is further configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects an insured's premium under an insured's insurance policy.

* * * * *

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Paper 15
Entered: February 12, 2013

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LIBERTY MUTUAL INSURANCE CO.
Petitioner

v.

PROGRESSIVE CASUALTY INSURANCE CO.
Patent Owner

Case CBM2012-00003 (JL)
Patent 8,140,358

Before JAMESON LEE, JONI Y. CHANG, and MICHAEL R. ZECHER, *Administrative Patent Judges*.

LEE, *Administrative Patent Judge*

DECISION
Institution of Covered Business Method Review
37 C.F.R. § 42.208

BACKGROUND

On September 16, 2012, Liberty Mutual Insurance Company ("Liberty") filed a petition requesting a review under the transitional program for covered business method patents of U.S. Patent 8,140,358 ("the '358 patent")(Ex. 1001). The patent owner, Progressive Casualty Insurance Company ("Progressive"), filed a preliminary response ("Prelim. Resp.") on December 24, 2012. (Paper No. 13.) We have jurisdiction under 35 U.S.C. § 324. *See* section 18(a) of the Leahy-Smith America Invents Act, Pub. L. 112-29, 125 Stat. 284, 329 (2011) ("AIA").

The standard for instituting a covered business method review is set forth in 35 U.S.C. § 324(a), which provides as follows:

> THRESHOLD --The Director may not authorize a post-grant review to be instituted unless the Director determines that the information presented in the petition filed under section 321, if such information is not rebutted, would demonstrate that it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable.

Some of the grounds of unpatentability alleged by Liberty were denied by the Board on October 25, 2012. (Paper 8). Additional grounds alleged by Liberty were denied by the Board on November 26, 2012. (Paper 12). The remaining grounds for consideration rely on the following references:

U.S. Pub. App. 2002/0128882 (**Nakagawa**)	Sept. 12, 2002	Exhibit 1005
UK Patent App. GB 2286369 (**Herrod**)	Aug. 16, 1995	Exhibit 1004

US Patent 5,243,530 (**Stanifer**)	Sep. 7, 1993	Exhibit 1007
US Patent 5,446,757 (**Chang**)	Aug. 29, 1995	Exhibit 1008
US Patent 5,210,854 (**Beaverton**)	May 11, 1993	Exhibit 1009
US Patent 7,228,211 B1 (**Lowrey**)	June 5, 2007	Exhibit 1011
US Patent 5,465,079 (**Bouchard**)	Nov. 7, 1995	Exhibit 1014
Japanese Pub. App. H4-182868 (**Kosaka**)	June 30, 1992	Exhibit 1003

"Communications And Positioning Systems In The Motor Carrier Industry," by Dimitris A. Scapinakis and William L. Garrison, January 1, 1992
(**Scapinakis**) Exhibit 1006

"Application of GSM in High Speed Trains: Measurements and Simulations" by Manfred Goller, May 16, 1995
(**Goller**) Exhibit 1017

"QUALCOMM's MSM6500 Multimedia Single-Chip Solution Enables High-Performance Multimode Handsets Supporting CDMA2000 1X, 1xEV-DO and GSM/GPRS," PR Newswire, November 12, 2002
(**Qualcomm MSM6500**) Exhibit 1019

Specifically, the grounds for consideration are:

1. Claims 1, 19, and 20 as anticipated by Nakagawa.
2. Claim 1 as obvious over Herrod.
3. Claim 2 as obvious over Nakagawa and Chang.
4. Claim 2 as obvious over Herrod and Chang.

5. Claims 3, 6, and 7 as obvious over Nakagawa and Stanifer.
6. Claims 3, 6, and 7 as obvious over Herrod and Stanifer.
7. Claim 4 as obvious over Nakagawa and Beaverton.
8. Claim 4 as obvious over Herrod and Beaverton.
9. Claims 5 and 8 as obvious over Nakagawa and Scapinakis.
10. Claim 5 as obvious over Herrod, Scapinakis, and Goller.
11. Claim 8 as obvious over Herrod and Scapinakis.
12. Claim 9 as obvious over Nakagawa and Hunt.
13. Claim 9 as obvious over Herrod and Hunt.
14. Claims 10, 11, and 13-15 as obvious over Nakagawa and Lowrey.
15. Claims 10, 11, and 13-15 as obvious over Herrod and Lowrey.
16. Claim 12 as obvious over Nakagawa, Lowrey, and Qualcomm MSM6500.
17. Claim 12 as obvious over Herrod, Lowrey, and Qualcomm MSM6500.
18. Claims 16-18 as obvious over Nakagawa and Bouchard.
19. Claims 16-18 as obvious over Herrod and Bouchard.
20. Claims 19 and 20 as obvious over Nakagawa and Kosaka.
21. Claims 19 and 20 as obvious over Herrod and Kosaka.

The above-stated grounds can be divided into two groups: (1) those relying at least in part on Nakagawa, and (2) those relying in part on Herrod.

Taking into account Progressive's preliminary response, we determine that the information presented in the petition demonstrates that:

> (1) It is more likely than not that the challenged claims based at least in part on Nakagawa are unpatentable as alleged by Liberty.
>
> (2) It is not more likely than not that the challenged claims based at least in part on Herrod are unpatentable.

Liberty certifies that the '358 patent was asserted against it in Case No. 1:10-cv-01370, *Progressive Cas. Ins. Co. v. Safeco Ins. Co. of Ill. et al.*, pending in the U.S. District Court for the Northern District of Ohio. (Pet. 7.) Progressive does not dispute that certification.

Pursuant to 35 U.S.C. §§ 324 and 18(a) of the AIA, we authorize a covered business method review of claims 1-20 of the '358 patent. For reasons discussed below, we reject Progressive's argument that the '358 patent is not a covered business method patent, but is directed to a technological invention for which covered business method review is unavailable.

DISCUSSION

A. Claim Construction

In a covered business method patent review, claim terms are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.300(b). Also, that broadest reasonable construction is as it would be understood by one of ordinary skill

in the art. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc). In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words. *Phillips*, 415 F.3d at 1314.

In this case, Liberty sets forth no claim construction that is purportedly different between that from the perspective of one with ordinary skill in the art on the one hand and that of lay persons on the other. We have no basis to conclude otherwise. So for purposes of this decision we proceed on the basis that the plain and ordinary meaning of words in their common usage applies, albeit taken in the context of the disclosure of the '358 patent.

We regard as prudent at this point of the proceeding to make known our construction of the term "rating factor." The petitioner states that under the rule of broadest reasonable interpretation in light of the specification, "rating factor" should mean "a calculated insurance risk value such as a safety score or a usage discount." (Pet. 15:11-14). In support of that assertion, Petitioner cites to portions of the specification of the '358 patent. (Pet. 15:14-20). Progressive presents no opposition to that interpretation. The interpretation offered by petitioner has solid basis in the specification. On this record, we agree with that interpretation, but add the clarification that an insurance risk value would be a value that reflects an associated level of insurance risk and, therefore, also a corresponding insurance premium.

B. Covered Business Method Patent

Under § 18(a)(1)(E) of the AIA, the Board may institute a transitional proceeding only for a patent that is a covered business method patent. Section 18(d)(1) of the AIA defines the term "covered business method patent" to mean:

> a patent that claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service, except that the term does not include patents for technological inventions.

The legislative history explains that the definition of covered business method patent was drafted to encompass patents "claiming activities that are financial or complementary to financial activity." 157 Cong. Rec. S5432 (daily ed. Sept. 8, 2011) (statement of Sen. Schumer).

Section 18(d)(2) of the AIA provides that "the Director shall issue regulations for determining whether a patent is for a technological invention." The legislative history points out that the regulation for this determination should only exclude "those patents whose novelty turns on a technological innovation over the prior art and are concerned with a technical problem which is solved with a technical solution and which requires the claims to state the technical features which the inventor desires to protect." 157 CONG. REC. S1364 (daily ed. Mar. 8, 2011) (statement of Sen. Schumer).

Pursuant to that statutory mandate, the Office promulgated 37 C.F.R. § 42.301(b) to define the term "technological invention" for the purposes of

the Transitional Program for Covered Business Method Patents. Therefore, for determining whether a patent is for a technological invention in the context of the Transitional Program for Covered Business Method Patents, 37 C.F.R. § 42.301(b) identifies the following for consideration:

> whether the claimed subject matter as a whole recites a technological feature that is novel and unobvious over the prior art; and solves a technical problem using a technical solution.

The determination of whether a patent is eligible for covered business method review is based on what the patent claims. A patent having even just one claim directed to a covered business method is eligible for review even if the patent includes additional claims.[1]

Claim 1 of the ’358 patent begins with this preamble: “A system that monitors and facilitates a review of data collected from a vehicle that is used **to determine a level of safety or cost of insurance.”** Claim 1 ends with the recitation: “where the server is further configured **to generate a rating factor** based on the selected vehicle data stored in the database.” As we have determined above, in the context of the specification of the ’358 patent, a “rating factor” is a calculated insurance risk value such as a safety score or a usage discount, which reflects a level of insurance risk and a corresponding insurance premium. The full text of claim 1 is reproduced below:

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[1] *Transitional Program for Covered Business Method Patents – Definitions of Covered Business Method Patent and Technological Invention; Final Rule*, 77 *Fed. Reg.* 48734, 48736 (Aug. 14, 2012) (Response to Comment 8).

> 1. A system that monitors and facilitates a review of data collected from a vehicle that is used to determine a level of safety that is used **to determine a level of safety or cost of insurance** comprising:
>
> a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle;
>
> a memory that stores selected vehicle data related to a level of safety or an insurance risk in operating a vehicle;
>
> a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network and a server;
>
> a database operatively linked to the server to store the selected vehicle data transmitted by the wireless transmitter, the database comprising a storage system remote from the wireless transmitter and the memory comprising records with operations for searching the records and other functions;
>
> where the server is configured to process selected vehicle data that represents one or more aspects of operating the vehicle with data that **reflects how the selected vehicle data affects a premium of an insurance policy, safety or level of risk**; and
>
> where the server is further configured **to generate a rating factor** based on the selected vehicle data stored in the database. (Emphasis added.)

It cannot be reasonably disputed that Progressive claims "an apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service." Claim 1 itself states that the system is used to determine a level of safety or cost of insurance and requires an operation on data which reflects how certain collected data affect a premium of an insurance policy, safety, or level of

risk. The claim also states that the server is configured "to generate a rating factor," and we have determined that "rating factor" means a calculated insurance risk value that reflects a corresponding insurance premium. The question at issue here centers on the "technological invention" exception to a covered business method patent.

To qualify under the "technological invention" exception to covered business method review, it is not enough that the invention makes use of technological systems, features, or components. Use of technology is ubiquitous and underlies virtually every invention. The exception is not that the claimed invention makes use of technology. We agree with Liberty that the subject matter of claim 1 does not satisfy the "technological invention" exception to covered business method review.

To qualify under the "technological invention" exception, the claimed subject matter as a whole must satisfy **both** of the following prongs:

1. recites a technological feature that is novel and unobvious over the prior art, and

2. solves a technical problem using a technical solution.

With respect to the first prong, all of the following arguments set forth by Progressive are misplaced because simply using technology, even novel technology, is not sufficient to qualify for the "technological invention" exception: (a) that the combination of elements set forth in claim 1 recites a novel configuration of technological features which operate in a unique manner; (b) that the novel configuration of the technological features, along with other innovations, enable Progressive to create an entirely new product

line known as "usage-based insurance"; (c) Progressive's novel technology provides a dramatic improvement over the prior art for use in determining vehicle insurance costs and ratings; (d) that the claims of the '358 patent recite technological features that are used to determine rating factors by directly monitoring actual vehicle operational characteristics; (e) that the claimed invention involves the use of electronics and sensors connected to a vehicle, which enable collecting and processing data concerning vehicle performance to occur; (f) that the claimed invention makes use of a network of hardware and sensors, wireless communication technology, and a server; (g) that the use of technological features permit the development of a rating factor that is specific to the operator or vehicle; (h) that the components shown in Figure 3 of the '358 patent are technological features configured to operate in a unique manner and ultimately used to determine insurance costs or operating factors; and (i) that the claims of the '358 patent recite significant technological features such as vehicle bus, communication technology, and server, all of which have a significant, *i.e.*, non-conventional, role in the novelty of the claimed invention.

Furthermore, and in any event, Progressive does not contend that any of the claimed structural components by itself constitutes a new technological feature, only that the combination of claim elements forms a novel configuration. And even the latter is unpersuasive in light of the prosecution history of the '358 patent and with respect to the subject matter of claim 1. In the Notice of Allowance and Issue Fee(s) Due of the '358 patent, the Examiner stated the following about U.S. Patent 5,835,008

("Colemere") which was issued on November 10, 1998, almost ten years prior to the actual filing date of the '358 patent and 18 months prior to the earliest priority date thus far alleged by Progressive (Ex. 1002: 000026):

> The prior art of record (US 5835008, Colemere) teaches:
>
> a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle;
>
> a memory that stores selected vehicle data related to a level of safety or an insurable risk in operating a vehicle;
>
> a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network and a server;
>
> a database operatively linked to the server to store the selected vehicle data transmitted by the wireless transmitter, the database comprising a storage system remote from the wireless transmitter and the memory comprising records with operations for searching the records and other functions.
>
> The above fully accounts for all the technical features of claim 1.

According to the Examiner, what are still missing from Colemere with respect to the claimed invention relate to the requirements that the server processes the vehicle data with other data that reflects how the vehicle data affects the premium of an insurance policy, safety or level of risk, and that the server generates a rating factor. (Ex. 1002 00026:16 to 00027:2). We have determined that "rating factor" means a calculated insurance risk value and reflects a corresponding insurance premium. As such, the difference between the invention of claim 1 and the prior art does not lie in any

technological feature, but on the nature of the data being processed and the meaning of the output data.

We reject Progressive's argument (Prelim. Resp. 16:1-7) that a difference in the nature of the data processed and the meaning of the output data represents a technological feature. Claim 1 of the '358 patent was allowed over the prior art not because of any novel and unobvious technological feature, but on the basis of the different data that are processed for determining a rating factor reflecting an insurance risk and a corresponding insurance premium.

Progressive's argument is without merit that its claimed invention is like the examples given in the Office Patent Trial Practice Guide, 77 *Fed. Reg.* 48764 (Aug. 14, 2012), for technological inventions not subject to covered business method review, *i.e.*, (a) a patent that claims a "novel and non-obvious" hedging machine for hedging risk in the field of commodities trading, and (b) a patent that claims a "novel and non-obvious" credit card reader for verifying the validity of a credit card transaction. Progressive's argument is also without merit that the claimed invention of the '358 patent is even more of a technological invention than those examples in the practice guide.

As we discussed above, based on the Examiner's explanation in the Notice of Allowance and Issue Fee(s) Due (Ex. 1002:00026-00027), the combination of technological elements of claim 1 is neither novel nor unobvious. Also, on this record, none of the claim elements, such as sensors, vehicle bus, wireless transmitter, database, computer, memory, and

server, is novel and unobvious when considered "without" the insurance nature of the data processed. In that regard, the Office Patent Trial Practice Guide, 77 *Fed. Reg.* 48764 (Aug. 14, 2012), states the following:

> The following claim drafting techniques would not typically render a patent a technological invention:
>
> (a) Mere recitation of known technologies, such as computer hardware, communication or computer networks, software, memory, computer-readable storage medium, scanners, display devices or databases, or specialized machines, such as an ATM or point of sale device.

Also, as is pointed out by Liberty, U.S. Patent 6,064,970, an ancestral patent of the '358 patent, filed almost ten years prior to the filing of the '358 patent and 18 months prior to the earliest effective filing date sought by Progressive in its preliminary response, discloses that current motor vehicle control and operating systems comprise electronic systems that are readily adaptable for modification to obtain the desired types of information relevant to the determination of the cost of insurance. (Ex. 1021 3:25-28). For all of the foregoing reasons, the subject matter of claim 1 is not like the examples of technological inventions in the Office Trial Practice Guide no matter how many structural component parts are recited, and certainly not more of a technological invention as asserted by Progressive.

Finally, with regard to the second prong of the "technological invention" analysis, that the claimed subject matter solves a technical problem using a technical solution, we agree with Liberty that the problem

noted in the specification about the prior art is not a technical problem. Specifically, in column 1, lines 24-29, the '358 patent states:

> Some data used to classify risk is not verified and has little relevance to measuring risk. Systems may accumulate and analyze significant amounts of data and yet discover that the data does not accurately predict losses. The data may not be validated, may be outdated, and may not support new or dynamic risk assessments.

The issue discussed concerns the potency and effectiveness of the data being analyzed for purposes of determining risk and predicting insurance losses. That is not a technical problem.

Progressive notes that a publication dated January 1, 1994 ("Black Magic") (Ex. 1015), referred to the general subject of "usage-based" insurance as "science fiction." The suggestion is that the invention of the '358 patent provides a technical solution to a technical problem. The argument is unpersuasive. The '358 patent was filed on June 3, 2008, and in its preliminary response Progressive claims priority for claim 1 to an earlier effective filing date no earlier than May 15, 2000. Even under the best of circumstances for Progressive in considering that the very first application in the ancestral chain of continuation and continuation-in-part applications leading back from the'358 patent, Progressive's earliest possible effective filing date would be January 29, 1996, still two years subsequent to the date of publication of Black Magic. In any event, as is reflected throughout the discussion above, on this record, "usage-based" insurance cost determination is not science fiction at the time of filing of the '358 patent.

Therefore, the second prong for qualifying as a "technological invention" is also not satisfied.

For the foregoing reasons, the subject matter of claim 1 is not a "technological invention" under 37 C.F.R. § 42.301(b). Accordingly, the '358 patent is eligible for a covered business method review.

C. Grounds based in whole or in part on Nakagawa

Claim 1 is the sole independent claim. Claims 2-20 depend directly or indirectly from claim 1. We have reviewed all of Liberty's assertions of unpatentability based at least in part on Nakagawa. Liberty asserts that claims 1, 19, and 20 are anticipated by Nakagawa under 35 U.S.C. § 102, and that claims 2-20 would have been obvious over Nakagawa and one or more other prior art references under 35 U.S.C. § 103. The accompanying analysis, excluding Liberty's assertion that the claims of the '358 patent are not entitled to a priority date earlier than the actual filing date of the '358 patent, appear to have merit. We do not reach Liberty's assertion that the claims of the '358 patent are not entitled to an effective filing date earlier than the actual filing date of the '358 patent, because entitlement to a priority date for any claim is a matter for which Progressive bears the burden of proof. We reject Progressive's arguments in that regard.

Progressive does not argue against the substantive merit of the alleged anticipation by Nakagawa and the alleged obviousness based on Nakagawa and one or more other references. Rather, Progressive asserts that Nakagawa is not an applicable prior art reference because the date of

Nakagawa as a prior art reference is September 12, 2002, while Progressive's claim 1 is entitled to a priority date under 35 U.S.C. § 120 at least as early as the filing date of Application 09/571,650 ("the '650 application"), now Patent 6,868,386, filed on May 15, 2000. (PR 22:7-12).

Progressive provides a claim chart purportedly showing where adequate written description under 35 U.S.C. § 112, first paragraph, for claim 1 can be found in the disclosure of the '650 application. (PR 23:12 to 31:16). On that basis, Progressive asserts that claim 1 of the '358 patent is entitled to a priority date of May 1, 2000, earlier than the September 12, 2002 publication date of Nakagawa. For three reasons, the argument is misplaced.

First, even assuming that the subject matter of claim 1 is described in the disclosure of the '650 application, filed on May 1, 2000, prior to the publication date of Nakagawa, Progressive has not established entitlement to the priority date of May 1, 2000. That is because if any application in the priority chain fails to make the requisite disclosure of the claimed subject matter under 35 U.S.C. § 112, first paragraph, the later-filed application is not entitled to the benefit of the filing date of the application preceding the break in the priority chain. *Hollmer v. Harari*, 681 F.3d 1351, 1355 (Fed. Cir. 2012). To gain the benefit of the filing date of an earlier filed application under 35 U.S.C. § 120, each application in the chain leading back to the earlier application must comply with the written description requirement of 35 U.S.C. § 112, first paragraph. *Zenon Envtl., Inc. v. U.S.*

Filter Corp., 506 F.3d 1370, 1378 (Fed. Cir. 2007); *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1571 (Fed. Cir. 1997); *In re Hogan*, 559 F.2d 595, 609 (CCPA 1977); *In re Schneider*, 481 F.2d 1350, 1356 (CCPA 1973).

The ’358 patent was never copending with the ’650 application. The ’650 application issued as Patent 6,868,386, on March 15, 2005, and the ’358 patent was issued from Application 12/132,487, filed on June 3, 2008. There is a gap or discontinuity of more than 3 years. There is an intervening application that is not accounted for or addressed by Progressive. The ’358 patent issued from Application 12/132,487, which is a continuation-in-part of Application 10/764,076, filed January 23, 2004, which is a continuation-in-part of the ’650 application. Without Application 10/764,076 bridging the gap between the ’358 patent and the ’650 application, there is no continuity of the chain leading from the ’358 patent back to the ’650 application. Thus, it is fatal to Progressive’s priority claim for claim 1 that Progressive does not discuss or identify written description for the claimed subject matter in the disclosure of Application 10/764,076. Note that substantial portions of the text of the ’650 application identified in Progressive’s priority claim chart are not found in Application 10/764,076.

Secondly, Progressive makes no attempt to establish entitlement to a priority date with respect to the subject matter of claims 2-8, and 10-18. Thus, even if the lack of continuity in the priority chain back to the ’650 application is ignored and even assuming that the disclosure of the ’650 application provides written description for the subject matter of

claims 1, 9, 19 and 20, that does not help Progressive's position with respect to claims 2-8, and 10-18.

Finally, for reasons discussed below, even as to the subject matter of claim 1, Progressive's priority claim chart does not persuade us that the disclosure of the '650 application provides written description for the claimed invention under 35 U.S.C. § 112, first paragraph. There are two deficiencies: (1) one relating to wirelessly transmitting selected vehicle data retained within the on-board memory to a distributed network and a server; and (2) another relating to various operations of the server.

Within the chart section provided by Progressive on page 28, lines 7-12 of the preliminary response, Progressive only explains that the vehicle is linked to an operation control center 416 by a communication link 418. Even if vehicle data is transmitted from the vehicle to the operations control center via that communication link, it does not establish that the wireless transmitter is "to transfer the selected vehicle data retained within the memory to a distributed network and a server" as is recited in claim 1. It is that particular data retained in the memory which must be transferred.

For the claim features of a server configured (1) to process selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects a premium of an insurance policy, safety or level of risk, and (2) to generate a rating factor, Progressive refers only to overall activities that are performed and a general rating system. In that regard, note the chart section provided by Progressive in the preliminary response from page 29, line 13, to page 31, line 16. No

server in the disclosure of the ’650 application has been identified. Nor has the assumed presence of such a server been explained. Claim 1 further requires the database to be operatively linked to the server. Without having identified the server, Progressive also has not accounted for that limitation.

The above-noted deficiencies also undermine Progressive’s assertion of priority claim with respect to claims 9, 19, and 20, each of which depends on claim 1. In addition, there are other deficiencies with regard to the limitations further set forth in claims 9, 19, and 20.

Claim 9 further requires that the processor, the memory, and the wireless transmitter are all within a portable device. Progressive refers to FIG. 3 of the ’650 application and identifies element 300 in Figure 3 as the portable device. However, element 300 in Figure 3 merely designates the on-board computer. Progressive does not identify a description of element 300 either as a portable device or as including the wireless transmitter. Figure 3 even illustrates transmitting antenna 312 outside of element 300.

Claim 19 adds the limitation that the server is configured to calculate an insured’s premium based on the rating factor, or a surcharge or discount to the premium based on the rating factor. The portions of the ’650 application cited by Progressive refer only generally to generation of an insurance cost based on all of the data and do not support a two-step procedure where a rating factor is first generated and then a premium or surcharge or discount to the premium is calculated based on that rating factor.

Claim 20 adds the limitation that the server is configured to process selected vehicle data that represents one or more aspects of operating the vehicle "with" data that reflects how the selected vehicle data affects an insured's premium under an insured's insurance policy. The portions of the '650 application cited by Progressive refer only generally to access of stored selected vehicle data to determine a cost of insurance based on that data, and do not account for the required processing of that data "with" data that reflects how the selected vehicle data affects an insured's premium under an insured's insurance policy.

For the foregoing reasons, through its preliminary response Progressive has not shown that any of claims 1-20 of the '358 patent is entitled to a priority date prior to the publication date of Nakagawa.

We conclude that it is more likely than not that Liberty would prevail on its assertion of unpatentability of claims 1, 19, and 20 as anticipated by Nakagawa under 35 U.S.C. § 102, and also more likely than not that Liberty would prevail on its assertion of unpatentability of claims 2-20 as obvious over Nakagawa and one or more other references under 35 U.S.C. § 103.

D. Grounds based in whole or in part on Herrod

Herrod discloses a monitoring device that is used in a vehicle to measure driver acceleration patterns. (Ex. 1004 1:23-26). Herrod's device contains a computer which uses the measured acceleration data to classify the driver into one of several groups, each of which associates with a different level of accident risk. (Ex. 1004 1:26-29). The device is contained in a rigid rectangular box to enable installation in the vehicle on a level

plane. (Ex. 1004 2:17-19). The device has a power lead for connection to the vehicle battery. (Ex. 1004 2:37-38). A separate display panel or the vehicle information display system is used to display to the driver the risk group determined by the device and an advice code. (Ex. 1004 2:33-34; 3:16-18). Herrod discloses that the driver's result is constantly updated using the most recent data recorded. (Ex. 1004 3:20-22). Finally, Herrod discloses that the time history of the driver's result and the corresponding acceleration patterns are stored on a removable card or disk so that they may be later processed by a remote computer installation. (Ex. 1004 3:23-25).

Claim 1

Petitioner asserts that independent claim 1 is unpatentable as obvious over Herrod under 35 U.S.C. § 103.

As Progressive notes in its preliminary response, in attempting to meet the recitation in claim 1 of the remote server's generating a rating factor based on the selected vehicle data stored in a database, Liberty incorrectly regards Herrod's description of the in-vehicle device as though it refers to a remote computer. For instance, to meet the requirement of a remote server's generating a rating factor, Liberty cites to and relies on the following text in Herrod (Ex. 1004 1:26-34) which actually describes the in-vehicle device (Petition 35:13-22):

> The device contains a computer, which processes accumulated acceleration data to determine to which of several behavioral groups the driver belongs. Each group is associated with a significantly different level of accident risk. Measurements made on many drivers over a long period are used to establish these levels of accident risk.

> The device supports a display panel, which indicates to the driver the group to which he or she has been assigned, together with a code indexing advice on how to change his or her driving habits to reduce accident risk.

Herrod's device is contained in a rigid rectangular box to enable installation in the vehicle on a level plane. (Ex. 1004 2:17-19). It does not meet the claimed requirement of a remote server. Herrod discloses that the time history of the driver's result and the corresponding acceleration patterns are stored on a removable card or disk so that they may be later processed by a remote computer installation. (Ex. 1004 3:23-25). But what process is performed at the remote computer installation is not specifically described. On page 2, lines 6-10, Herrod does state:

> The programming means (eg card or disk) are initialized [sic] by a separate computer, which is also used to read the recorded acceleration patterns and the time history of driver group and advice codes. This information is added to a database, which is used to update the algorithms used for analyzing the acceleration patterns and the accident statistics.

The above-quoted text, however, is a generic description and not sufficiently specific to meet the claim requirement that the remote server is configured to generate a rating factor. Even assuming, *arguendo*, that analyzing acceleration patterns and accident statistics constitutes generating a rating factor, the description only indicates that the remote computer updates the algorithm for that analysis and not that it carries out the analysis.

Moreover, Herrod describes that it is "driver's results" of the in-vehicle analysis that are later transferred to a remote computer facility. (Ex. 1004 3:23-25). The description indicates that the pertinent analysis, the one referred to by Liberty as satisfying the claim limitation of generating a rating factor, is already performed before the results are transferred to the remote computer.

Regarding claims 2-20, which depends either directly or indirectly from claim 1, Liberty's reasoning suffers from the same deficiencies as discussed above for independent claim 1.

On this record, Liberty's petition does not demonstrate that it is more likely than not that Liberty will prevail on its assertion that claim 1 of the '358 patent is unpatentable as obvious over Herrod under 35 U.S.C. § 103. Also, the petition does not demonstrate that it is more likely than not that Liberty will prevail on its assertion that claims 2-20 of the '358 patent are unpatentable as obvious over Herrod and one or more other prior art references as applied by Liberty under 35 U.S.C. § 103.

ORDER

For the forgoing reasons, it is

ORDERED that pursuant to 35 U.S.C. § 324 and section 18(a) of the AIA, a covered business method review is hereby instituted as to claims 1-20 of the '358 patent on the following grounds:

A. Claims 1, 19, and 20 as anticipated under 35 U.S.C. § 102(b) by Nakagawa;

B. Claim 2 as unpatentable under 35 U.S.C. § 103 over Nakagawa and Chang;

C. Claims 3, 6, and 7 as unpatentable under 35 U.S.C. § 103 over Nakagawa and Stanifer;

D. Claim 4 as unpatentable under 35 U.S.C. § 103 over Nakagawa and Beaverton;

E. Claims 5 and 8 as unpatentable under 35 U.S.C. § 103 over Nakagawa and Scapinakis;

F. Claim 9 as unpatentable under 35 U.S.C. § 103 over Nakagawa and Hunt;

G. Claims 10, 11, and 13-15 as unpatentable under 35 U.S.C. § 103 over Nakagawa and Lowrey;

H. claim 12 as unpatentable under 35 U.S.C. § 103 over Nakagawa, Lowrey, and Qualcomm MSM6500;

I. claims 16-18 as unpatentable under 35 U.S.C. § 103 over Nakagawa and Bouchard; and

J. claims 19 and 20 as unpatentable under 35 U.S.C. § 103 over Nakagawa and Kosaka.

FURTHER ORDER that no other ground for any claim is authorized for this covered business method review;

FURTHER ORDERED that all still-pending grounds based at least in part on Herrod are *denied* and Progressive need not address them in the patent owner's response;

FURTHER ORDER that pursuant to 35 U.S.C. § 324(d) and 37 C.F.R. § 42.4, notice is hereby given of the institution of trial; the trial commences on the entry date of this decision; and

FURTHER ORDER that an initial conference call with the Board is scheduled for 2 PM EST on February 28, 2013; the parties are directed to the Office Trial Practice Guide, 77 *Fed. Reg*. at 48765-66, for guidance in preparing for the initial conference call.

Case CBM2012-00003
U.S. Patent No. 8,140,358

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CERTIFICATE OF SERVICE

I hereby certify that on this 18th day of November 2014, I caused the foregoing corrected brief to be electronically filed using the CM/ECF system, which will send notification of such filing to all parties of record.

I further certify that pursuant to Fed. R. App. P. 25(a)(2)(D) and 25(c), Federal Circuit Rule 25(a), and ECF-10(B) of the Court's Administrative Order Regarding Electronic Case Filing, dated May 17, 2012, I shall cause six paper copies of the foregoing corrected brief to be filed at the address provided below within five days of the court's acceptance of the foregoing brief in ECF:

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Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

1. This brief complies with the type-volume limitation of Federal Rule of Appellate Procedure 32(a)(7)(B), because it contains 11,903 words, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(a)(7)(B)(iii) and Federal Circuit Rule 32(b).

2. This brief complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) and the type style requirements of Federal Rule of Appellate Procedure 32(a)(6), because it has been prepared in a proportionally spaced typeface using Microsoft Word 2010 in Times New Roman 14 point font.

November 14, 2014

/s/ *Gary M. Ropski*

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